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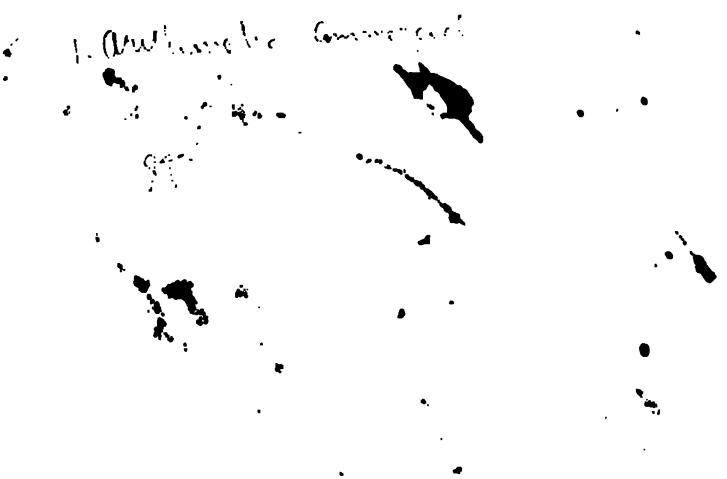
ANNEX

Thomas H. Gibbons.

his

Book

Rooté by a friend



A

NEW SYSTEM

OF

MERCANTILE ARITHMETIC:

ADAPTED TO THE

Commerce of the United States,

IN ITS

DOMESTIC AND FOREIGN RELATIONS;

WITH

FORMS OF ACCOUNTS AND OTHER WRITINGS USUALLY OCCURRING IN TRADE.

BY MICHAEL WALSH.

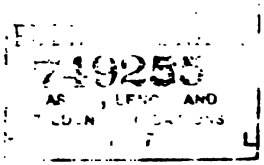
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Newburyport:

PRINTED BY EDMUND M. BLUNT (PROPRIETOR.)

Sold by him, No. 8, State-Street, and by the principal Bookſellers in the United States.

1801.


719255

District of Massachusetts District.

TO WIT——

L.S. **Be it remembered,** That on the seventeenth day of April, in the twenty-fourth year of the Independence of the United States of America, MICHAEL WALSH, of the said District, hath deposited in this Office the title of a Book, the right whereof he claims as Author, in the words following, to wit:

"A New System of Mercantile Arithmetic: Adapted to the commerce of the United States, in its domestic and foreign relations. With forms of accounts and other writings usually occurring in Trade.—By MICHAEL WALSH."

In conformity to the Act of the Congress of the United States, intituled "An Act for the Encouragement of Learning, by securing the copies of Maps, Charts and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned."

N. GOODALE, Clerk of the District of Massachusetts District.

A true copy of record,

Attest, N. GOODALE, Clerk.

RECOMMENDATIONS.

Newburyport, May 1, 1800.

WE the ſubſcribers, having ſeen Mr. WALSH's New Syſtem of MERCANTILE ARITHMETIC, and being ſatisfied that it is better calculated than any yet publiſhed, to fit a youth for the buſineſs of the Compting-Houſe, cannot but wiſh it an extenſive circulation. The happy elucidation and extended application of the common rules, together with the many original improvements, while they accompliſh the ſtudent for commerce, are alſo extremely well adapted to aſſiſt and inform the merchant, the mariner, and the trader in their various occupations.

DUDLEY A. TYNG.
EBENEZER STOCKER.
WILLIAM BARTLET.
SAMUEL A. OTIS, jun.
TRISTRAM COFFIN.
MOSES BROWN.
WILLIAM WYER, jun.
RICHARD BARTLET, jun.
WILLIAM W. PROUT.
MICHAEL LITTLE.

Boſton, May 16th, 1800.

WE the ſubſcribers, having examined Mr. WALSH's New Syſtem of MERCANTILE ARITHMETIC, and being perſuaded that it is better calculated than any we have met with, to qualify young men for admiſſion into compting-houſes, we wiſh that it may have an extenſive circulation. The clear exemplification and pertinent application of the common rules, together with the many uſeful additions and improvements which it contains, will render it extremely uſeful for the merchant, the mariner, and all the other trading claſſes of ſociety.

MARSTON WATSON.
JOHN C. JONES.
JOHN CODMAN
STEPHEN HIGGINSON.
JOHN LOWELL, jun.
JOSEPH RUSSELL.
ARNOLD WELLES, jun.
JONATHAN JACKSON.

Salem, October 7th, 1800.

WE the ſubſcribers, Merchants of Salem, convinced of the neceſſity of rendering the forms of buſineſs, the value of coins, and the nature of commerce more familiar to the United States as a commercial people, do approve of the MERCANTILE ARITHMETIC of Mr. WALSH, and recommend it as calculated to ſubſerve in the beſt manner the inſtruction of our youth, and the purpoſes of a well-informed merchant.

WM. GRAY, jun.
BENJ. HODGES.
B. PICKMAN.
NATH. BOWDITCH.
JACOB ASHTON.
WM. PRESCOTT.
JACOB CROWNINSHIELD.
ELIAS HASKET DERBY.

Preface.

THE object of this work is to combine, with the common rules of Arithmetic as taught in our ſchools, a general knowledge of mercantile calculations at home and abroad, including the Exchange as it has actually exiſted in the lateſt intercourſe between this and foreign countries. The ſhip-maſter and ſupercargo will here find ſome intereſting information relative to foreign trade, and ſeveral uſeful forms of buſineſs, ſuch as have in fact occurred in ſome of the beſt conducted voyages, which have been made from the United States.

No labour has been ſpared in conſulting ſuch books as have been publiſhed in Europe and the Indies reſpecting Exchange; and the numerous publications in Arithmetic have not been neglected. In this part, the treatiſes of BONNYCASTLE, VOSTER and WALKINGHAM have furniſhed the principal extracts.

THE work is now reſpectfully offered to the public, with the intention of the Author to correct every error which may be found in it, and to add whatever may occur, as conducive to its original deſign, of rendering mercantile calculations eaſy and familiar to thoſe, who wiſh to qualify themſelves for buſineſs.

FOR the countenance and aid the Author has received from gentlemen in Boſton, Salem and Newburyport, he tenders them his unfeigned thanks; at the ſame time, he indulges the hope, that the expectations which will naturally be excited by the reſpectable teſtimonials, with which the manuſcript was honoured, and which are now prefixed to the work, will not be diſappointed on examination of its contents.

NEWBURYPORT, JAN. 1, 1801.

Thomas H. Gibbons
his
Book
Rooted by a friend

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EXPLANATION

OF THE CHARACTERS USED IN THIS WORK.

= SIGNIFIES equality, or equal to: as, 20 ſhillings = 1 pound: that is, 20 ſhillings are equal to 1 pound.

+ Signifies more, or addition: as 6+6=12, that is, 6 added to 6 is equal to 12.

— Signifies leſs, or ſubtraction; as, 6—2=4; that is, 6 leſs 2 is equal to 4.

× Signifies multiplication; as 6×2=12; that is, 6 multiplied by 2 is equal to 12.

÷ Signifies diviſion; as 6÷2=3; that is, 6 divided by 2 is equal to 3.

Diviſion is ſometimes expreſſed by placing the numbers like a fraction, the upper figure being the dividend and the lower the diviſor: thus, $\frac{54}{6}=9$; that is 54 divided by 6 is equal to 9.

: :: : Proportion; as, 3 : 6 :: 9 : 18; that is, as 3 is to 6, ſo is 9 to 18.

√ Prefixed to any number, ſignifies that the ſquare root of that number is required.

ERRATA.

Page 109, queſt. 25, for 296 read 196.
113, 4th line in 6th parag. for 1795 read 1785.
144, queſt. 7, after £.24 13 11 read Sterling.
159, queſt. 2, for 7261 read 7621.
193, queſt. 1, for 163 ſtivers read 16.

ARITHMETIC.

ARITHMETIC is the art of computing by numbers, and has five principal rules for this purpoſe, viz. *Numeration*, *Addition*, *Subtraction*, *Multiplication* and *Diviſion*.

NUMERATION

Teacheth to expreſs any propoſed number by theſe ten characters, 0. 1. 2. 3. 4. 5. 6. 7. 8. 9—0 is called a cypher, and the reſt figures or digits. The relative value of which depends upon the place they ſtand in, when joined together, beginning at the right hand as in the following

TABLE.

9	8	7	6	5	4	3	2	1
hundreds of millions.	tens of millions.	millions.	hundreds of thouſands.	tens of thouſands.	thouſands.	hundreds.	tens.	units.

Though the table conſiſts of only nine places, yet it may be extended to more places at pleaſure; as, after hundreds of millions, read thouſands of millions, ten thouſands of millions, hundred thouſands of millions, then millions of millions, &c.

TO WRITE NUMBERS.

RULE. Write down the figures as their values are expreſſed, and ſupply any deficiency in the order with cyphers.

EXAMPLES.

Write down in proper figures the following numbers,
Twenty-nine,
Two hundred and forty-ſeven,

Seven thouſand nine hundred and one,
Eighty-four thouſand three hundred and twenty-nine,
Nine hundred and two thouſand ſix hundred and fifteen,
Eighty-nine millions and ninety,
Four millions four hundred thouſand and forty,
Nine hundred and nine millions nine hundred and ninety,
Seventy millions ſeventy thouſand and ſeventy.

Eleven thouſand eleven hundred and eleven.		Fourteen thouſand fourteen hundred and fourteen.	
eleven thouſand	11000	fourteen thouſand	14000
eleven hundred	1100	fourteen hundred	1400
eleven	11	fourteen	14
Total	12111	Total	15414

To expreſs in words any number propoſed in figures.

RULE. To the ſimple value of each figure, join the name of its place, beginning at the left hand and reading towards the right.

EXAMPLES.

Write down in words the following numbers,

46, 199, 2267, 86693, 289732, 11911911,
1169990, 9919, 4320, 5500510,

SIMPLE ADDITION

Teacheth to collect numbers of the ſame denomination into one ſum.

EXAMPLES.

Gallons.	Yards.	Buſhels.
68965	59473	875496
14753	8914	170900
29684	675	574
57693	29	9
171095		
171095		
17573	180041	750010
468	4095	31994
57	83	573
9	7326	74837

As the mercantile method of proving addition is to reckon downwards, as well as upwards, the ſums of which will be equal when the addition is juſt; two ſpaces are left for the work.

SIMPLE SUBTRACTION

Teacheth to take a leſs number from a greater of the ſame denomination, and thereby to ſhew the difference.

EXAMPLES.

	Yards.		Gallons.
From	57468532	From	29689141
Take	26587491	Take	17938762
Rem.	30881041	Rem.	11750379
Proof	57468532	Proof	29689141

2	from 924357	take	565383	Rem. 358974
3	517684		291872	225812
4	510090		191939	318151
5	191191		2957	188234
6	291619		829	290790
7	500910		15723	485187

SIMPLE MULTIPLICATION

Is a compendious way of adding numbers of the ſame name.
The number to be multiplied is called the multiplicand.
The number which multiplies is called the multiplier.
The number ariſing from the operation is called the product.

THE TABLE.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	21	32
12	24	36	48	60	72	84	96	108	120	132	144

EXAMPLES.

Multiplicand	5965468	4765293	6281947
Multiplier	2	3	4
Product	11930936	14295879	25127788

4	Mult. 2658758	by 5	product	13293790
5	9674372	6		58046232
6	7689657	7		53827599
7	2674876	9		24073884
8	4198543	10		41985430
9	7491685	11		82408535
10	2689489	12		32273868
11	1768735	20		35374700
12	2891496	400		1156598400
13	5749851	78		448488846
14	2653294	872		2513672368
15	78965987	5893		465346561391
16	562916859	490070		275868665090130

SIMPLE DIVISION

Teacheth to find how often one number is contained in another of the ſame name.

The number given to be divided, is called the *dividend*.

The number by which to divide, is called the *diviſor*.

The number of times the *diviſor* is contained in the *dividend* is called the *quotient*.

The *remainder*, if there be any, will be leſs than the *diviſor*.

PROOF.

Multiply the quotient by the diviſor; to the product add the remainder, and the ſum will be equal to the dividend, if the work be right.

EXAMPLES.

	Dividend	
Diviſor	2)6945689 46	3)27689541 84
		Rem.
Quotient	3472844 73	9229848 61—1
	2	3
Proof	6945689 46	27689541 84

	Dividend	Quotient	
Diviſor	52)6495436(	124912	
	52	52	
	129	249824	
	104	624560	
	255	12	Rem.
	208	6495436	Proof.
	474		
	468		
	63		
	52		
	116		
	104		
	12		

					Quotient.		Rem.
4	Divide	8965462	by	6	Anſ. 1494243	and	4
5		3728675		8	466084		3
6		4654682		9	517186		8
7		2768967		10	276896		7
8		1949952		11	177268		4
9		2968967		12	247413		11
10		5268794		20	263439		14
11		29619145		40	740478		25
12		4198253 67		500	839650		367
13		2968762 34		64	4638691		10
14		47989536925		735	65291886		715
15		26574983184		8962	2965296		432
16		53479689236		7684	6959876		2052
17		49179689 67		2359	2084768		1255
18		3258675689		67435	48323		14184

When the diviſor is a compound number, that is, if any two figures, being multiplied together, will make that number, then divide the dividend by one of thoſe figures, and the firſt quotient by the other figure, and it will then give the quotient required.——But as it ſometimes happens that there is a remainder to each of the quotients, and neither of them the true one, it may be found by this

RULE. Multiply the firſt diviſor by the laſt remainder, and to the product add the firſt remainder, which will give the true one.

EXAMPLES.

Divide 296876234 by 64

8)296876234

8)37109529—2

Quotient 4638691 and 1×8+2=10 remaining.

Divide 8757635 by 28

Quotient 312772 and 19 rem.

Divide 18957492 by 42

451368 and 36 rem.

Divide 1571196 by 72

Quotient 21822 and 12 rem.

Divide 3751749 by 96

39080 and 69 rem.

MISCELLANEOUS QUESTIONS.

1. Add 562163, 21964, 56321, 18536, 4340, 279, and 83 together. Anſ. 663686.

2. What number is it, which being added to 9709 will make it 110901? Anſ. 101192.

3. General WASHINGTON was born in the year 1732; how old was he in 1799? Anſ. 67 years.

4. Add up twice 397, three times 794, four times 3176, five times 15880, ſix times 95280, and once 333040.

Anſ. One million.

5. A caſhier received, viz. Four hundred and nine dollars, twenty thouſand and thirteen dollars, Eight thouſand five hundred and ten dollars, Nine hundred and twenty-eight dollars; of which he paid away Fifteen thouſand fifteen hundred and fifteen dollars: What was the whole ſum he received, and how much remains after deducting the payment?

Anſ. He received 29860 dolls. and there remains 13345 dolls.

6. What is the product of 15927 multiplied by 4009?

Anſ. 63851343.

7. 128 men have one half of a prize, worth 34560 dollars, to be equally divided between them: What is each man's part?

Anſ. 135 dollars.

Prove this anſwer to be right.

8. Three merchants, A, B, and C, have a ſtock of 14876 dollars, of which A put in 4963 dollars, B 5198 dollars, and C the remainder: How much did C put in? Anſ. 4715 dollars.

TABLES OF MONEY, WEIGHTS, MEASURES, &c.

Federal Money.

10 Mills	make	1 Cent.
10 Cents	make	1 Dime.
10 Dimes, or 100 Cents,	make	1 Dollar.
10 Dollars	make	1 Eagle.

English Money.

4 Farthings	make	1 Penny.
12 Pence	make	1 Shilling.
20 Shillings	make	1 Pound.

Pence Table.

d.		*s.*	*d.*
20	are	1	8
30		2	6
40		3	4
50		4	2
60		5	0
70		5	10
80		6	8
90		7	6
100		8	4
110		9	2
120		10	0
130		10	10
140		11	8
150		12	6
200		16	8

Shillings Table.

s.		*£.*	*s.*
20	are	1	0
30		1	10
40		2	0
50		2	10
60		3	0
70		3	10
80		4	0
90		4	10
100		5	0
110		5	10
120		6	0
130		6	10
140		7	0
150		7	10
200		10	0

Troy Weight.

24 Grains	make	1 Pennyweight.
20 Pennyweights	make	1 Ounce.
12 Ounces	make	1 Pound.

Note. By this weight are weighed jewels, gold, silver, and liquors.

Avoirdupois Weight.

16 Drams	make	1 Ounce.
16 Ounces	make	1 Pound.
28 Pounds	make	1 Quarter.
4 Quarters	make	1 Hundred Weight.
20 Hundred Weight	make	1 Ton.

Note. By this weight are weighed such commodities as are coarse and subject to waste, and all metals except gold and silver. One pound Avoirdupois is equal to 14 oz. 11 pwt. and 15½ gr.

Apothecaries Weight.

20 Grains	make	1 Scruple.	
3 Scruples	-	-	1 Dram.
8 Drams	-	-	1 Ounce.
12 Ounces	-	-	1 Pound.

Note. Apothecaries uſe this weight in compounding their medicines; but they buy and ſell their drugs by Avoirdupois weight.

Cloth Measure.

4 Nails	make	1 Quarter.	
4 Quarters	-	-	1 Yard.
3 Quarters	-	-	1 Ell Flemiſh.
5 Quarters	-	-	1 Ell Engliſh.
6 Quarters	-	-	1 Ell French.

Long Measure.

3 Barley Corns	make	1 Inch.	
12 Inches	-	-	1 Foot.
3 Feet	-	-	1 Yard.
5½ Yards, or 16½ Feet,	-	1 Pole, Rod, or Perch.	
40 Poles	-	-	1 Furlong.
8 Furlongs	-	-	1 Mile.
3 Miles	-	-	1 League.
60 Geographical, or 69½ Statute Miles,	-	1 Degree.	

Note. In this meaſure, length only is conſidered.

Land or Square Measure.

144 Square Inches	make	1 Square Foot.
9 Feet	-	1 Yard.
30¼ Yards, or 272¼ Feet	-	1 Pole, Rod, or Perch.
40 Poles or Perches	-	1 Rood.
4 Roods	-	1 Acre.

Note. This meaſure reſpects length and breadth.

Wine Measure.

2 Pints	make	1 Quart.	
4 Quarts	-	-	1 Gallon.
42 Gallons	-	-	1 Tierce.
63 Gallons	-	-	1 Hogſhead.
84 Gallons	-	-	1 Puncheon.
2 Hogſheads	-	-	1 Pipe or Butt.
2 Pipe or 4 Hogſheads	-	-	1 Tun.

Note. The wine gallon contains 231 cubic inches.

Ale and Beer Measure.

2 Pints	make	1 Quart.
4 Quarts		1 Gallon.
8 Gallons		1 Firkin of Ale.
9 Gallons		1 Firkin of Beer.
2 Firkins		1 Kilderkin.
2 Kilderkins		1 Barrel.
54 Gallons		1 Hhd. of Beer.
3 Barrels		1 Butt.

Note. The ale gallon contains 282 cubic inches.

Cubic or Solid Measure.

1728 Inches	make	1 Foot.
27 Feet		1 Yard.
40 Feet of round Timber or 50 Feet of hewn Timber		1 Ton or Load.
128 Solid Feet		1 Cord of Wood.

Note. 8 feet in length, 4 in breadth, and 4 in height, making 128 solid feet, contain a cord of wood. This measure respects length, breadth, and thickness.

Dry Measure.

2 Pints	make	1 Quart.
2 Quarts		1 Pottle.
2 Pottles		1 Gallon.
2 Gallons		1 Peck.
4 Pecks		1 Bushel.
2 Bushels		1 Strike.
4 Bushels		1 Coom.
8 Bushels		1 Quarter.
36 Bushels		1 Chaldron.
5 Quarters		1 Wey.
2 Weys		1 Last.

Note. The gallon dry measure contains 268$\frac{4}{5}$ cubic inches.

Time.

60 Seconds	make	1 Minute.
60 Minutes		1 Hour.
24 Hours		1 Day.
365 Days		1 Year.

Note. 365 days 5 hours 48 minutes 57 seconds make a solar year according to the most exact observation.

The number of days in each month is thus found:

Thirty days hath September, April, June, and November;
February hath twenty-eight alone; and all the rest have thirty-one.

When the year can be divided by 4 without a remainder, it is Bissextile or Leap-Year, in which February hath 29 days.

COMPOUND ADDITION

Teacheth to collect numbers of different denominations into one total.

Federal Money.

D.	*C.*	*M.*	*D.*	*C.*	*M.*
174	74	3	396	14	4
198	19	3	147	19	5
157	14	4	149	57	9
196	76	9	157	83	8

English Money.

£.	*s.*	*d.*	*£.*	*s.*	*d.*
149	14	6¼	814	16	6½
387	19	8½	198	18	8¾
259	16	7¼	376	14	9½
874	17	4¾	226	16	7¼
678	15	6½	174	17	10½

Troy Weight.

lb.	*oz.*	*dwt.*	*gr.*	*lb.*	*oz.*	*dwt.*	*gr.*
48	7	14	19	83	11	15	22
95	4	17	22	15	6	16	19
27	5	14	15	21	8	19	23
65	6	19	16	33	9	15	14
19	7	13	15	46	4	13	17

Avoirdufois Weight.

Ton	*Cwt.*	*qr.*	*lb.*	*oz.*	*dr.*	*Cwt.*	*qr.*	*lb.*
18	17	1	14	13	13	593	1	19
36	15	3	16	13	15	187	3	19
29	15	2	19	12	13	159	2	25
14	16	3	27	14	12	283	3	13
16	19	2	25	13	10	146	2	18
57	17	1	14	15	9	259	1	22

Apothecaries' Weight.

lb.	*oz.*	*dr.*	*sc.*	*gr.*
8	7	5	1	17
1	8	2	2	13
2	5	3	2	14
8	4	2	1	15
5	2	1	2	17
2	8	1	2	18

lb.	*oz.*	*dr.*	*sc.*	*gr.*
2	5	3	2	11
1	2	2	1	14
8	3	5	2	13
5	5	4	1	12
2	9	3	2	15
1	6	4	2	17

Cloth Measure.

yd.	*qr.*	*nl.*
571	1	3
184	2	2
196	2	3
283	3	2
146	2	3
375	3	2

E.Fl.	*qr.*	*nl.*
873	2	3
196	2	2
158	1	1
147	2	3
326	2	2
194	2	1

E.Fr.	*qr.*	*nl.*
181	2	2
196	3	3
157	4	2
168	3	3
193	5	2
214	2	3

E.E.	*qr.*	*nl.*
56	1	2
19	2	3
14	3	2
26	4	3
83	2	2
57	3	3

Wine Measure.

Tun	*hhd.*	*gal.*	*qt.*	*pt.*
187	1	17	3	1
56	3	15	2	1
9	1	29	3	1
36	2	18	2	1
217	3	57	1	1
56	1	46	2	1

Tun	*hhd.*	*gal.*	*qt.*	*pt.*
176	3	16	2	1
59	2	57	3	1
8	3	14	2	1
17	2	19	1	1
168	1	38	2	1
25	2	52	3	1

Ale and Beer Measure.

hhd.	*gal.*	*qt.*	*pt.*
49	38	2	1
38	45	3	1
57	48	2	1
49	37	1	1
57	26	2	1
28	18	3	1

hhd.	*gal.*	*qt.*	*pt.*
78	17	3	1
19	16	2	1
15	51	3	1
76	43	2	1
23	26	3	1
52	38	2	1

Cloth Measure.

	yd.	*qr.*	*nl.*	*E.Fl.*	*qr.*	*nl.*	*E.E.*	*qr.*	*nl.*	*E.Fr.*	*qr.*	*nl.*
From	251	1	2	189	2	1	419	1	3	389	2	2
Take	127	3	3	120	2	2	174	3	2	189	5	3

Wine Measure.

	tun.	*hd.*	*gal.*	*qt.*	*pt.*	*tun.*	*hd.*	*gal.*	*qt.*	*pt.*
From	591	1	13	1	1	800	1	50	2	1
Take	126	2	56	3	1	149	2	61	3	1

Ale and Beer Measure.

	hd.	*gal.*	*qt.*	*pt.*	*hd.*	*gal.*	*qt.*	*pt.*
From	571	19	3	1	100	36	2	1
Take	198	53	2	1	9	27	3	1

Dry Measure.

	qr.	*bu.*	*gal.*	*qt.*	*chal.*	*bu.*	*gal.*	*qt.*
From	38	4	5	3	69	21	3	2
Take	17	5	1	2	49	33	5	3

Long Measure.

	deg.	*m.*	*fur.*	*p.*	*f.*	*in.*	*bc.*	*m.*	*fur.*	*p.*	*f.*
From	819	13	1	19	11	3	1	219	3	14	11
Take	159	49	2	27	16	8	2	209	7	15	12

Land Measure.

	acr.	*roo.*	*per.*	*acr.*	*roo.*	*per.*	*acr.*	*roo.*	*per.*
From	591	1	11	501	3	13	219	2	21
Take	129	3	15	190	2	21	156	1	36

Time.

	yrs.	*da.*	*hr.*	*m.*	*sec.*	*yrs.*	*da.*	*hr.*	*m.*	*sec.*
From	171	143	11	14	19	811	111	15	23	52
Take	128	174	19	51	14	389	190	21	48	54

PRACTICAL QUESTIONS IN COMPOUND ADDITION AND SUBTRACTION.

1. CAST up the following ſums, viz. Twenty-three ſhillings and five pence, One pound and nine pence, Seven ſhillings and eleven pence three farthings, Twenty pounds thirteen ſhillings and nine pence, fifteen pence three farthings.

	£.	s.	d.
	1	3	5
	1	0	9
	0	7	$11\frac{3}{4}$
	20	13	9
	0	1	$3\frac{3}{4}$
Anſ.	£.23	7	$2\frac{1}{2}$
Proof	£.23	7	$2\frac{1}{2}$

2. Twenty dollars and four cents, Five dollars and three mills, Eighty-two cents, Six dollars and five mills.

Anſ. 31 dols. 86 cts. 8 m.

3. Seventy dollars, Three dollars and three cents, Thirty-four cents and four mills, Eighty dollars and a half, Six dollars and a quarter. Anſ. 160 dols. 12 cts. 4 mills.

4. Ten pounds and three pence, Forty-five ſhillings and ten pence half-penny, Thirty-ſeven ſhillings and four pence three farthings, Nine pounds and three farthings, One ſhilling and ſix pence farthing, Eighty-two ſhillings and four pence half-penny.

Anſ. £.27 7 $5\frac{1}{4}$

5. Thirty dollars ſix cents and a half, Fifty-three cents and three quarters, Eleven cents and a quarter, Nine dollars eleven cents and a half, Fifty-four cents. Anſ. 40 dols. 37 cents.

6. Take Three ſhillings and four pence from One pound two ſhillings and a penny. Anſ. 18*ſ.* 9*d.*

7. From £.5 2*ſ.* 1*d.* take nine ſhillings and ſix pence half-penny. Anſ. £.4 12 $6\frac{1}{2}$

8. Take Twenty ſhillings and three farthings from £.8.

Anſ. £.6 19 $11\frac{1}{4}$

9. From 18 dollars take Eight mills. Anſ. 17 dols. 99 cts. 2 m.

10. Take 53 dimes from 53 Eagles. Anſ. 524 dol. 7 dim. or 70 cts.

11. A merchant bought 112 bars of iron weighing 56 cwt. 1 qr. 11 lb. of which he ſold 59 bars weighing 29 cwt. 3 qrs. 21 lb.; how many bars has he remaining, and what is the weight?

Anſ. 53 bars, weighing 26 cwt. 1 qr. 18 lb.

12. Required the total weight of 4 hogſheads of ſugar weighing as follows, viz. No. 1. 9 cwt. 2 qrs. 21 lb. No. 2. 10 cwt. 3 qrs. 23 lb. No. 3. 8 cwt. 2 qrs. 25 lb. No. 4. 9 cwt. 3 qrs. 17 lb.

Anſ. 39 cwt. 1 qr. 2 lb.

13. A ropemaker received 3 tons 15 cwt. 3 qrs. 14 lb. of hemp to be wrought, of which he delivered in cordage 34 cwt. 1. qr. 22 lb.; how much remains? Anſ. 2 tons 1 cwt. 1 qr. 20 lb.

14. Received 57953 mills, 4953 cents, 1913 dimes and 45 eagles; required the total ſum. Anſ. 748 dols. 78 cts. 3 mills.

15. A caſhier received, viz. One hundred pounds and nine pence half-penny, Three thouſand ſeven hundred and four pounds ten ſhillings, Twenty thouſand and ninety pounds two ſhillings and eleven pence three farthings, of which he paid away Sixteen thouſand ſixteen hundred and ſixteen pounds; how much has he on hand?
Anſ. £.6278 13 9¼

16. A farmer bought three pieces of land, meaſuring, viz. the firſt piece 21 acres 3 roods 19 poles; the ſecond, 87 acres 2 roods 29 poles; the third, 27 acres 2 roods 25 poles; of which he ſells 15 acres 2 roods 39 poles; how much has he remaining?
Anſ. 71 acres 1 rood 34 poles.

17. A has paid B £.9 15 6¼ £.19 11 9¼ £.14 19 7½ and 54s. 3½d. on account of a debt of £.50; how much is there ſtill unpaid? Anſ. £.2 18 9¼

REDUCTION.

Reduction teacheth to change numbers from one denomination to another without loſing their value.

Rule. When the Reduction is deſcending multiply the higheſt denomination by as many of the next as make one of the greater, adding to the product the parts of the ſame name, and ſo on to the laſt.

When the Reduction is aſcending, divide the given number by as many of that denomination as make one of the next higher, and ſo on to the denomination required, and the laſt quotient with the ſeveral remainders (if any) will be the anſwer.

The proof is by reverſing the queſtion.

Federal Money.

1. In 53 dollars how many mills?

53 dolls.
10
530 dimes.
10
5300 cents.
10
Anſ. 53000 mills.

Or decimally, by adding a cypher for each inferior denomination, thus,

dols.	*dim.*	*c.*	*m.*
53	0	0	0

2. In 14000 mills how many dollars?

10)14000
10)1400
10)140

Or decimally, by ſeparating the figures, counting from the right to the name required, thus,

dolls.
14,000 mills.

Anſ. 14 dols.

3. In 57935 mills how many dollars?
Anſ. 57 dollars, 93 cents and 5 mills.
4. How many Eagles in 1933 dimes?
Anſ. 19 Eagles, 3 dollars, 3 dimes.
5. In 1290 mills how many dimes? Anſ. 12 dimes and 9 cents.
6. How many cents in 46 dollars? Anſ. 4600 cents.
7. In 190004 mills how many dollars?
Anſ. 190 dollars and 4 mills.

ENGLISH MONEY.

1. In £.91 11 3½ how many farthings?

91	11	3½
20		
1831	ſhillings	
12		
21975	pence	
4		

Anſ. 87902 farthings

Proof.
4)87902
12)21975—2
20)1831—3
£.91 11 3½

2. How many pounds in 3175 farthings? Anſ. £.3 6 1¾.
3. In 19ſ 8¼d how many farthings? Anſ. 947 farthings.
4. How many pounds in 9752 pence? Anſ. £.40 12 8
5. In £.46 how many crowns of 6ſ 7d each?
Anſ. 139 crowns and 4 ſhillings and 11 pence.
6. How many pounds in 493 dollars? Anſ. £.147 18
7. In 143 pence how many ſhillings? Anſ. 11ſ 11d
8. Reduce 38ſ 4½d to half pence. Anſ. 921 half pence.
Prove the above anſwers to be right.

TROY WEIGHT.

1. In 15 lb. troy how many grains? Anſ. 86400 grs.
2. How many ounces in 5749 dwt.? Anſ. 287 oz. 9 dwt.
3. In 11 oz. 13 dwt. 13 grs. how many grs.? Anſ. 5605 grs.
4. How many grains in 15 ſpoons, each weighing 6 dwt. 15 grs.?
Anſ. 2385 grs.

AVOIRDUPOIS WEIGHT.

1. In 19 tons 14 cwt. 2 qrs. 19 lb. 11 oz. 13 drs. how many drams? Anſ. 1131613 drs.

2. How many cwt. in 9563 lb.? Anſ. 85 cwt. 1 qr. 15 lb.
3. In 13 cwt. 3 qrs. 21 lb. how many pounds? Anſ. 1561 lb.
4. How many meſs-pieces of 4½ lb. and 3½ lb. of each an equal number, in 31 cwt. 1 qr. 12 lb. of beef? Anſ. 439 pieces of each.

Wine Measure.

1. In 25 tuns of wine how many pints? Anſ. 50400 pints.
2. How many hogſheads in 4935 quarts? Anſ. 19h. 36g. 3qt.
3. In 3 hhds. 13 gls. 2 qts. how many half pints?
Anſ. 3240 half pints.

Cloth Measure.

1. In 158 yards how many nails? Anſ. 2528 nails.
2. How many ells Engliſh in 5932 nails? Anſ. 296 ells 3 qrs.
3. In 29 pieces of holland, each containing 36 ells Flemiſh, how many yards? Anſ. 783 yds.

Long Measure.

1. In 29 miles how many inches? Anſ. 1837440 inches.
2. How many furlongs in 19753 yards? Anſ. 89 fur. 173 yds.
3. In 590057 inches how many leagues?
Ans. 3 lea. 2 fur. 110 yds. 1 f. 5 in.

Time.

1. How many hours in 57 years, allowing each year to be 365 days 6 hours? Anſ. 499662 hours.
2. In 57053 hours how many weeks? Anſ. 344 w. 6 da. 17hr.
3. How many days from 19th March to the 23d September following? Anſ. 188 days.
4. How many days from 24th May, 1797, to 15th December, 1798? Anſ. 570 days.

Land Measure.

1. In 41 acres 2 roods 14 perches, how many rods?
Anſ. 6654 rods or perches.
2. How many ſquare rods in 7732 ſquare feet?
Anſ. 28 rods 129 feet.
3. In 5972 perches, how many acres? Anſ. 37 ac. 1 rood 12 per.

Solid Measure.

1. In a pile of wood 96 feet long, 5 feet high, and 4 feet wide, how many cords? Anſ. 15 cords.
2. In 82 tons of round timber how many inches? Anſ. 566840 in.
3. What are the contents of a load of wood, 6 feet long, 4 feet high, and 2½ feet wide? Anſ. 3¾ feet.

GRINDSTONES are ſold by the cubic foot, commonly called a ſtone, and the contents are thus found:

RULE. To the whole diameter add half of the diameter, and multiply the ſum of theſe by the ſame half, and this product by the thickneſs; divide this laſt number by 1728, the inches in a cubic foot, and the quotient is the contents, or anſwer required.

EXAMPLE.

4. How many cubic feet in a grindſtone, 24 inches diameter, and 4 inches thick?

```
  24  diameter.
  12  half diameter.
 ----
  36
  12
 ----
 432
   4  thickneſs.
 ----
1728)1728
 ----
Anſ.  1  foot.
```

5. What are the contents of a grindſtone, 36 inches diameter, and 4 inches thick?

```
  36
  18
 ---
  54
  18
 ----
 432
  54
 ----
 972
   4
 ----
1728)3888(2¼
     3456
     ----
      432
        4
     ----
1728)1728(1
     1728
     ----
```

Anſ. 2¼ cubic feet.

AMERICAN MONIES.

To change New-England and Virginia currency to Federal money, the dollar being 6 ſhillings.

RULE. As the value of a dollar is equal to three-tenths of a pound, when pounds are given to be changed, annex three cyphers to the ſum, and divide the whole by 3; the quotient is the anſwer in cents.

EXAMPLE.

1. Change £.523 to Federal money.

3)523000

174333⅓ cents. Anſ. 1743 dols. 33⅓ cts.

Change the following ſums, viz.

	£.		dols.	cts.
2.	184	Anſ.	613	33⅓
3.	29		96	66⅔
4.	57		190	
5.	219		730	
6.	81		270	
7.	127		423	33⅓

When pounds and ſhillings are given, to the pounds annex half the number of ſhillings and two cyphers, if the number of ſhillings in the given ſum be even; but if the number be odd, annex half the number, and then 5 and one cypher, and divide by 3; the quotient is the anſwer in cents.

EXAMPLES.

1. Change £.59 18s. to Federal money.

3)59900

19966⅔ cts. Anſ. 199 dols. 66⅔ cts.

2. Change £.93 13s. to Federal money.

3)93650

31216⅔ cts. Anſ. 312 dols. 16⅔ cts.

Change the following ſums, viz.

	£.	s.		*dols.*	*cts.*
3.	129	13	Anſ.	432	16⅔
4.	63	15		212	50
5.	27	18		93	
6.	182	19		609	83⅓
7.	57	16		192	66⅔
8.	121	7		404	50

When there are ſhillings, pence, &c. in the given ſum, annex for the ſhillings as before directed, and to theſe add the farthings in the given pence and farthings, obſerving to increaſe their number by one when they exceed 12, and by two when they exceed 37, and divide as before.

EXAMPLES.

1. Change £.21 8*s*. 4½*d*. to Federal money.

3)21419

7139⅓ cts.

4 is annexed to the pounds for half the ſhillings, and 19 for the farthings in 4½*d*. and exceſs of 12.

Anſ. 71 dols. 39⅓ cts.

2. Change £.117 16*s*. 2*d*. to Federal money.

3)117808

39269⅓ cts. Anſ. 392 dols. 69⅓ cts.

3. Change £.721 9*s*. 11¼*d*. to Federal money.

3)721497

240499 cts.

In this example 4 is annexed to the pounds for half the even ſhillings, and 47 for the farthings in 11¼*d*. and exceſs of 37, and then 5 is added to the figure next to half the ſhillings, making it 9 in place of 4 for the odd ſhilling. Anſ. 2404 dols. 99 cts.

4. Change £.29 11*s*. 2¼*d*. to Federal money.

3)29559

9853 cts. Anſ. 98 dols. 53 cts.

Change the following ſums, viz.

	£.	*s*.	*d*.		*dols*.	*cts*.
5.	25	19	9	Anſ.	86	62½
6.	24	11	7¼		81	94
7.	1238	10	9½		4128	46⅔
8.	2001	1	3½		6670	21⅔
9.	153	17	6		512	91⅔

A TABLE

FOR CHANGING SHILLINGS AND PENCE INTO CENTS AND MILLS.

	ſhill. 0		*ſhill*. 1		*ſhill*. 2		*ſhill*. 3		*ſhill*. 4		*ſhill*. 5	
pence.	*cts*.	*m*.	*cts*.	*m*.	*cts*.	*m*.	*cts*.	*m*.	*cts*.	*m*.	*cts*.	*m*.
0			16	7	33	3	50	0	66	7	83	3
1	1	4	18	1	34	7	51	4	68	1	84	7
2	2	8	19	5	36	1	52	8	69	5	86	1
3	4	2	20	9	37	5	54	2	70	9	87	5
4	5	6	22	3	38	9	55	6	72	3	88	9
5	7	0	23	7	40	3	57	0	73	7	90	3
6	8	3	25	0	41	7	58	3	75	0	91	6
7	9	7	26	4	43	0	59	7	76	4	93	0
8	11	1	27	8	44	4	61	1	77	8	94	4
9	12	5	29	2	45	8	62	5	79	2	95	8
10	13	9	30	6	47	2	63	9	80	6	97	2
11	15	3	32	0	48	6	65	3	82	0	98	6

To change Federal Money to New-England and Virginia currency.

RULE. When the ſum is dollars only, multiply it by 3 and double the firſt figure of the product for ſhillings, and the reſt of the product will be pounds.

When there are cents in the given ſum, multiply the whole by 3 and cut off three figures of the product to the right hand as a remainder.

Multiply this remainder by 20 and cut off as before.

Proceed in this manner through the ſeveral parts of a pound, and the numbers ſtanding on the left hand, make the anſwer, in the ſeveral denominations.

NOTE. If there be mills, cut off four figures and proceed as above.

EXAMPLE.

1. Change 872 dollars to New-England currency.

872
3
261 12

£. s.
Anſ. 261 12

2. Change 1971 dolls. 96⅔ cents to Maſſachuſetts currency.

1971 96⅔
3
£. 591,590
20
s. 11,800
12
d. 9,600
4
f. 2.400
Anſ. £. 591 11 9½

3. Reduce 1259 dols. 89 cts. and 7 mills, to Maſſ. currency.

1259 89 7
3
£. 377,9691
20
s. 19,3820
12
d. 4,5840
4
f. 2,3360
Anſ. £. 377 19 4½

A TABLE for changing Cents into Shillings, Pence and Farthings.

		Cents. 10		Cents. 20		Cents. 30		Cents. 40		Cents 50		Cents 60		Cents. 70		Cents. 80		Cents 90	
cents	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
0			7¼	1	2½	1	9½	2	4¾	3	0	3	7¼	4	2½	4	9½	5	4¾
1	¼		8	1	3	1	10¼	2	5½	3	0¾	3	8	4	3	4	10¼	5	5½
2	1½		8¾	1	3¾	1	11	2	6¼	3	1½	3	8¾	4	3¾	4	11	5	6¼
3	2¼		9¼	1	4½	1	11¾	2	7	3	2¼	3	9¼	4	4½	4	11¾	5	7
4	3		10	1	5¼	2	0½	2	7¾	3	2¾	3	10	4	5¼	5	0½	5	7¾
5	3¾		10¾	1	6	2	1¼	2	8½	3	3½	3	10¾	4	6	5	1¼	5	8½
6	4½		11½	1	6¾	2	2	2	9	3	4¼	3	11½	4	6¾	5	2	5	9
7	5	1	0¼	1	7½	2	2¾	2	9¾	3	5	4	0¼	4	7½	5	2¾	5	9¾
8	5¼	1	1	1	8	2	3¼	2	10½	3	5¾	4	1	4	8	5	3¼	5	10½
9	6½	1	1¾	1	8¾	2	4	2	11¼	3	6½	4	1¾	4	8¾	5	4	5	11¼

To change New-York and North-Carolina currency to Federal money, the dollar being 8 ſhillings.

RULE. Prepare the given ſum by the rule for New-England money, and divide by 4; the quotient is the anſwer in cents.

EXAMPLES.

1. Change £.461 to Federal money.

4)461000

115250 cts. Anſ. 1152 dols. 50 cts.

2. Change £.419 10ſ. 8½d. to Federal money.

4)419535

104883¾ cts. Anſ. 1048 dols. 83¾ cts.

To change Federal money to New-York and North-Carolina currency.

RULE. As for Maſſachuſetts currency, uſing 4 as a multiplier inſtead of 3; the value of a dollar being equal to four-tenths of a pound.

EXAMPLES.

1. Change 1684 dollars to New-York and North-Carolina currency.

1684
4

Anſ. £. 673 12

2. Change 1048 dols. 83¾ cents to New-York currency.

1048,83¾
4

419,535
20

10,700
12

8,400
4

1,600 Anſ. £.419 10ſ. 8¼d.

To change New-Jerſey, Pennſylvania, Delaware and Maryland currency to Federal money, the dollar being 7ſ. 6d.

RULE. As the value of a dollar is equal to ¾ of a pound, multiply the given ſum, when it is pounds only, by 8, and divide by 3 for dollars. If there be ſhillings, &c. increaſe the ſum in pence by ⅓ of the whole ſum for cents.

EXAMPLES.

1. Change £.471 to Federal money.

471
8

3)3768

Anſ. 1256 dollars.

2. Change £.480 19ſ. 9d. to Federal money.

480 19 9
20

9619
12

9)115437
12826⅓

12826⅓ cents. Anſ. 1282 dls. 63⅓ cts.

To change Federal money to New-Jerſey, Pennſylvania, Delaware and Maryland currency.

RULE. Multiply the ſum, when in dollars, by 3, and divide by 8 for pounds. If there be dollars and cents, multiply the given ſum by 90, and the product (rejecting two figures on the right) is pence, or deducting $\frac{1}{10}$ of the ſum gives the pence likewiſe.

EXAMPLES.

1. Change 1256 dollars to Pennſylvania currency.

1256
3

8)3768

Anſ. £.471

2. Change 1282 dls. 63⅓ cts. to Pennſylvania currency.

	Or
12826⅓	$\frac{1}{10}$)12826⅓
90	12826⅓
12)115437,00	12)115437
20)9619—9	20)9619—9
Anſ. £.480 19 9	£.480 19 9 as before.

To change South-Carolina and Georgia currency to Federal money, the dollar being 4ſ. 8d.

RULE. As the value of a dollar is equal to $\frac{7}{30}$ of a pound, if the ſum be pounds only multiply it by 30, and divide by 7 for dollars. If there ſhillings, &c. annex two cyphers to the pence in the given

ſum, and divide by 56, the pence in a dollar, the quotient is the anſwer in cents.

EXAMPLES.

1. Change £.28 to Federal money.

28
30
7)840
120 Anſ. 120 dollars.

2. Change £. 11 4 8 to Federal money.

11 4 8
20
224
12
8×7=56 8)269600
7)33700
4814 $\frac{2}{7}$ cts. Anſ. 48 dols. 14$\frac{2}{7}$ cts.

To change Federal money to South-Carolina and Georgia currency.

RULE. Multiply the dollars by 7, and divide by 30 for pounds. If there be dollars and cents multiply by 56, and the product (rejecting two figures on the right) is the anſwer in pence.

EXAMPLES.

1. Change 540 dollars to South-Carolina and Georgia currency.

540
7
30)3780
Anſ. £.126

2. Change 48 dols. 14$\frac{2}{7}$ cts. to South-Carolina currency.

4814$\frac{2}{7}$ 56
56 2
28884 7)112
24070 16
16
12)2696 00
20)224—8
11 4 8 Anſ. £.11 4 8

To change Canada and Nova-Scotia currency to Federal money, the dollar being 5 ſhillings.

RULE. As the value of a dollar is equal to one-fourth of a pound, multiply the ſum, when in pounds, by 4, for dollars.

When there are ſhillings, &c. reduce the given ſum to pence, annex two cyphers, and divide by 60, for cents.

EXAMPLES.

1. Change £.36 Canada currency to Federal money.

36
4

Anſ. 144 dols.

2. Change £.528 12*s.* 6*d.* Canada currency to Federal money.

20	Or thus,	528	
		4	
10572		2112	
12	10 ſhill.	= 2	
6\|0)1268700\|0	2*s.* 6*d.*	= 0	50
211450 cts.		2114	50

Anſ. 2114 dols. 50 cts.

To change Federal money to Canada and Nova-Scotia currency.

RULE. Divide the ſum in dollars by 4 for pounds.

If there be dollars and cents, multiply the given ſum by 60, and the product (rejecting two figures on the right) is the anſwer in pence.

EXAMPLES.

1. Change 144 dollars to Canada currency.

4)144

Anſ. £.36

2. Change 2114 dols. 50 cts. to Canada or Nova-Scotia currency.

211450
60

12)12687000

2\|0)1057\|2—6

528 12 6 Anſ. £.528 12*s.* 6*d.*

COMPOUND MULTIPLICATION.

Is the multiplying numbers of different denominations, by a ſimple figure or figures whoſe product ſhall be equal to a propoſed number.

I. When the quantity does not exceed 12, multiply the price by the quantity and the product will be the anſwer.

Multiply by	£	191	17	8½	£	913	11	9¾
				2				5
Anſ.	£	383	15	5	£	4567	19	0¾
	£	980	19	11¾	£	209	18	4½
				12				9

1. What will 7 yards of ſhalloon come to at 3ſ 5 per yard?

	s	d
	3	5
		7
£.	1 3	11

		s	d	£		
2.	4lb tea - -	6	8	£ 1	6	8
3.	5 buſhels Rye	5	9	1	8	9
4.	6 gallons Wine	7	5	2	4	6
5.	7 quintals fiſh	19	6	6	16	6
6.	9 Cwt. Iron	29	10	13	8	6
7.	11 gallons brandy	8	5	4	12	7
8.	12 quintals fiſh	22	10	13	14	0

II. If the number or quantity exceeds 12, and is to be found in the table, multiply by its component parts.

EXAMPLES.

		s	d
1.	14 yards durant at	2	5
			2
		4	10
			7
Anſ.	£.	1 13	10

			s	d	£	s	d
2.	16 yards ſilk	at	4	9	£. 3	16	0
3.	20 lb. coffee		1	9½	1	15	10
4.	28 gallons rum		6	5¾	9	1	5
5.	45 cwt. iron		29	6	66	7	6
6.	56 yards broadcloth		28	7	80	0	8
7.	63 pair ſhoes		9	3	29	2	9
8.	84 quintals fiſh		18	6	77	14	0
9.	100 galls. molaſſes		3	5½	17	5	10
10.	121 buſhels corn		4	3	25	14	3
11.	141 gallons brandy		5	7¾	40	13	0

To multiply by fractional parts, as ½, ¼, ⅞, *&c.*

RULE. Multiply the price by the upper figure of the fraction, and divide the product by the lower, the quotient will be the anſwer; but when the upper figure is not more than one, dividing the price or ſum by the lower figure gives the anſwer.

EXAMPLES.

1. What is ⅜ of a yard of cambrick worth, at 12*s*/6 per yard?

12 6
3
8)37 6
Anſ. 4*s*. 8¼*d*.

2. What is ¾ of a yard of broadcloth worth, at 35*s*. per yard.

35
3
4)105
Anſ. 26*s*. 3*d*.

Or thus, 2)35
2)17 6 price of half a yard.
8 9 a quarter.
26 3

3. One quarter of a yard of fine linen, at 7*s*. 6*d*. per yard.

4)7 6
Anſ. 1*s*.10½*d*.

4. Multiply £.4 5*s*. 3*d*. by ⅓, or take ⅓ of it.

3)4 5 3
Anſ. £.1 8 5

5. Multiply £.9 6s. 8d. by $\frac{7}{8}$, or take $\frac{7}{8}$ of it.

	9	6	8
			7
8)65	6	8	
Anſ. £.8	3	4	

III. When the number does not exceed the table, and it cannot be found in it, find the neareſt to it, either leſs or greater; then, after having found the price of this number, add or ſubtract the value of ſo many, as it is leſs or greater than the given number.

EXAMPLES.

1. 37 buſhels of corn, at 4s. 11d. per buſhel.

	4	11		
		6		
1	9	6		
		6		
8	17	0	price of	36 buſhels.
	4	11	price of	1 buſhel.
Anſ. £.9	1	11	price of	37 buſhels.

			s.	d.		£.	s.	d.
2.	17¼ yards ſhalloon	at	2	8	Anſ.	2	6	0
3.	23½ lb. coffee		1	10½		2	4	6¼
4.	57½ galls. rum		4	2½		12	1	11¾
5.	87¾ yds. baize		2	1		9	2	9¾
6.	109 quintals of fiſh		14	6		79	0	6
7.	137¼ gallons of molaſſes		3	8¼		25	6	1¼

IV. When the number is above the table, find the price of each figure as in the following

EXAMPLES.

1. 178 yards of muſlin at 4s. 5d. per yard.

	4	5		
		10		
2	4	2		
		10		
22	1	8	price of	100 yards.
15	9	2	price of	70
1	15	4	price of	8
Anſ. £.39	6	2	price of	178 yards.

2. $284\frac{1}{2}$ gallons of molaſſes, at 3*s*. $9\frac{1}{2}d$. per gallon.

		3	$9\frac{1}{2}$
			10
1	17	11	
			10
18	19	2	
			2
37	18	4	price of 200 gallons.
15	3	4	price of 80
	15	2	price of 4
	1	$10\frac{3}{4}$	price of $\frac{1}{2}$

Anſ. £.53 18 $8\frac{3}{4}$ price of $284\frac{1}{2}$ gallons.

				s.	*d*.		£.	*s*.	*d*.
3.	183	gals. gin	at	7	5	Anſ.	67	17	3
4.	345	quintals of fiſh		23	9		409	13	9
5.	$769\frac{3}{4}$	lb. coffee		1	10		70	11	$2\frac{1}{2}$
6.	$809\frac{1}{2}$	yds. baize		2	$1\frac{1}{2}$		86	0	$2\frac{1}{4}$
7.	$2375\frac{1}{2}$	gals. of molaſſes		3	$5\frac{1}{2}$		410	15	$3\frac{1}{4}$

8. Three barrels of N. E. Rum, containing 31, $32\frac{1}{2}$ and $33\frac{1}{4}$ gallons, at $4/7\frac{1}{2}$ per gallon. Anſ. £.22 7 $5\frac{1}{2}$.

9. Four hogſheads of Molaſſes, containing $97\frac{1}{2}$, $99\frac{1}{2}$, $105\frac{1}{4}$ and $111\frac{3}{4}$ gallons, at $3/8\frac{1}{4}$ per gallon, are delivered by A to B, to who he owed 258 dollars. It is required to know the ballance, and in whoſe favour it is? Anſ. 4*s*. $1\frac{1}{2}d$. in favour of B.

When the amount of a cwt. is required at a certain rate per lb.

RULE. Find the price of one or two quarters, and multiply the product by the component parts of a cwt.

10. 1 cwt. of Flour at 3*d*. per lb.

		3	
		7	
1	9		
	8		
14	0		price of two quarters.
		2	

Anſ. £.1 8 0 price of one cwt.

Or by inverting the queſtion thus,

9	4		the price of 112lb. at 1*d*. per lb.
		3	
£.1	8	0	the price of 112lb. at 3*d*. per lb.

			d.		£.		
2.	Two cwt.	Flour	$2\frac{1}{2}$ per lb.		2	6	8
3.	Three	Rice	$2\frac{3}{4}$		3	17	0
4.	Four	Iron	$3\frac{1}{4}$		6	1	4
5.	Five	Indigo	8/11$\frac{1}{2}$		250	16	8

1. What will 4000 feet of boards come to at 38/4 per thouſand?

1 18 4
4 M.

Anſ. £.7 13 4

2. 3,596 feet of boards at 36/ per thouſand.

3,596
36

21576
10788

ſhills. 129,456

Anſ. £.6 9 5

In this example three figures are dotted off as a remainder, and the fourth figure of the product of this remainder multiplied by 12 is ſet down for pence.

3. 853 feet of boards at 30/. per thouſand.

853
30

ſhills. 25,590

Anſ. £. 1 5 7

4.	3,231 feet of	3 inch	W. O. plank,	225/.	£.36	6	11
5.	8,637	$2\frac{1}{2}$		150/.	64	15	6
6.	,960	2		100/.	4	16	0
7.	,888	$2\frac{1}{2}$	pine,	100/.	4	8	9

Plank are ſold per thouſand of $2\frac{1}{2}$ inches, the uſual thickneſs for planking veſſels, and as there are generally other dimenſions as 2 and 3 inches, the price of each is regulated by the price of the $2\frac{1}{2}$, adding to it, or ſubtracting from it, in ſuch proportion as may be agreed on when purchaſing. In the above example, taken from an actual ſale, $\frac{1}{2}$ of 150/. was added to it, for the three inch and $\frac{1}{3}$ deducted from it for the two inch, making the three inch 225/. and the two inch 100/. per thouſand.

WEIGHTS AND MEASURES.

	lb.	*oz.*	*dwt.*	*grs.*		*lb.*	*oz.*	*dwt.*	*grs.*
Multiply	14	9	14	17		825	8	19	22
by				5					8
Product	74	0	13	13		6605	11	19	8

T.	*cwt.*	*qt.*	*lb.*
19	17	3	25
			9

cwt.	*qrs.*	*lb.*	*oz.*	*drs.*
17	1	14	11	14
				7

T.	*hhd.*	*gal.*
87	1	57
		5

T.	*p.*	*hhd.*	*gal.*
28	1	1	62
			7

What is the weight of 47 caſks of rice, each weighing 2*C.* 1*qr.* 23*lb.*?
Anſ. 115 cwt. 1 qr. 17 lb.

BILLS OF PARCELS.

Boſton, June 25, 1799.

Mr. George Rowe

Bought of William Ruſſell,

		s.	*d.*	*L.*	*s.*	*d.*
8 pairs worſted hoſe	at	4	6	1	16	0
5 do. thread do.		3	2		15	10
3 yds. kerſeymere		14		2	2	
6 do. muſlin		4	2	1	5	
2 do. tammy		1	8		3	4
4 ſhawls		7	6	1	10	0
				£.7	12	2

25 dols. 36 cts.

Mr. *Thomas Barrington*
Bo't of *Simon Wilſon,*

Portſmouth, 19*th May,* 1799.

	s.	*d.*	
1¼ lb. Tea - -	4	6	- -
4½ buſhels Corn -	5	4	- -
5 quarts Brandy -	8	4	per gallon -
6 do. Rum - -	7	6	- -
7¼ yds. Chintz -	2	5	- -
			£.3 11 0¾

11 dols. 84⅓ cts.

Mr. Amos Giles *Salem, 23d May, 1799.*

Bo't of Lemuel King,

				s.	d.	£.	s.	d.	
10	boys' coloured hats,	No. 1.	at	4	6				
12	do.	2.		5					
4	do.	2.		5	6				
4	do.	9.		10					
4	do.	10.		11					
6	do.	11.		12					
6	men's plain black do. bound	12.		14					
						£.	18	7	0
					Trunk		1	4	
						£.	19	11	0

65 dols. 16⅔ cts.

Boston, 10th Auguſt, 1799.

Mr. Nathan Perkins

Bo't of George Allen,

			s.	d.	-	£.	s.	d.	
64½	yds. ſtriped Nankins	at	2	0	-				
32	ells mode -		3		-				
28½	yds. calico -		2	4	-				
2	groce gilt coat buttons		18	6	-				
3	pieces ruſſel -		34		-				
						£.	21	10	6

71 dols. 75 cts.

Newburyport, 15th May, 1799.

Mr. William Sands,

Bought of Stephen Nowlan,

	s.	d.	£.	s.	d.
2 pieces Muſlin	30				
25 yards Iriſh linen	4				
28½ do Stormount Calico	2	6			
28½ do Red do	2	2			
1 piece Durant	56				
2 pieces Blue Shalloon	57	6			
50½ yards Dimity	2	6			
3 pieces Perſian	84				
			£ 39	12	3
			Stamp	1	6
			39	13	9

132 dols. 29 cts.

Received payment by his note of the above date, at three months,

For Stephen Nowlan,

Abraham Truſty.

COMPOUND DIVISION

Teacheth to find how often one number is contained in another of different denominations.

EXAMPLES.

1. Divide £.19 14 9½ by 2.

2)19 14 9½

Anſ. £.9 17 4¾

2. Divide £.900 11 9¾ by 3. Anſ. £.300 3 11¼

Prove this anſwer to be right.

3. Divide £.121 7 9¾ by 5. Anſ. 24*l.* 5*s.* 6¾*d.*
4. Divide 248*l.* 9*s.* 1½*d.* by 9. Anſ. 27*l.* 12*s.* 1½*d.*
5. Divide 1057*l.* 1*s.* 3*d.* by 12. Anſ. 88*l.* 1*s.* 9¼*d.*

II. If the diviſor exceeds 12, and it be found in the table, divide by its component parts.

EXAMPLES.

1. Divide 278*l.* 8*s.* 9*d.* between 45 men equally.

5)278 8 9

9)55 13 9

Anſ. £.6 3 9 each.

2. If 20 lb. of indigo coſt 7*l.* 5*s.* 10*d.* what is it per lb.?
Anſ. 7*s.* $3\frac{1}{2}$*d.*

3. If 24 yds. of Durant coſt 62*s.* 6*d.* what is it per yard?
Anſ. 2*s.* $7\frac{1}{4}$*d.*

4. If 72 buſhels of corn coſt 20*l.* 9*s.* 6*d.* what is it per buſhel?
Anſ. 5*s.* $8\frac{1}{4}$*d.*

5. If 108 lb. of tea coſt £.45 13 6 what is 1lb. worth?
Anſ. 8*ſ.* $5\frac{1}{2}$*d.*

6. When £.166 13 4 is paid for 500 gallons of rum, what is it per gallon? Anſ. 6*ſ.* 8*d.*

7. If 1000 gallons of molaſſes coſt £.209 7 6 what is it per gallon? Anſ. 4*ſ.* $2\frac{1}{4}$*d.*

III. If the diviſor cannot be found by the multiplication of ſmall numbers, as the preceding examples, divide by it as in the following

EXAMPLES.

1. Divide £.46 1 11 by 37

	£.	s.	d.
37)46 1 11(	1	4	11
37			
9			
20			
37)181(	4		
148			
33			
12			
37)407(	11		
37			
37			
37			

2. Divide £.33 13 $8\frac{1}{2}$ by 23. Anſ. £.1 9 $3\frac{1}{2}$.

3. If 345 quintals of fiſh coſt £.409 13 9 how much is it per quintal? Anſ. 23*ſ.* 9*d.*

Dividing by fractional parts, as $\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{5}$, &c. is the ſame as multiplying by them. See the Rule under caſe II. in compound multiplication.

1. How much is $\frac{1}{4}$ of £.91 11 3

91	11	3	Or thus 2	91	11	3
		3				
			2	45	15	$7\frac{1}{2}$ one half the ſum.
4)274	13	9		22	17	$9\frac{3}{4}$ one quarter.
Anſ. £.68	13	$5\frac{1}{4}$		68	13	$5\frac{1}{4}$ anſwer.

2. Divide £.126 19 5¼ by ¼. Anſ. £.101 11 7.
3. If the whole of a ſhip is worth £.960 what is ⅝ worth?
Anſ. £.600.
4. If ⅜ of a ſhip was ſold for £.1056 2 1 what was the whole valued at? Anſ. £.1689 15 4.

IV. Having the price of a hundred weight, to know how much it is per pound.

RULE. Find the price of 1 or 2 quarters and then divide by the component parts.

1. If 1 cwt. of ſteel coſt £.4 6 4 what is it per lb.?

4 | 4 6 4 Or thus 2 | 4 6 4

4 | 1 1 7 price of 1 qr. 7 | 2 3 2 price of 2 quarters.

7 | 0 5 4¾ 8 | 0 6 2

Anſ. 0 0 9¼ per lb. 0 0 9¼ per lb.

2. If 1 cwt. of flour coſt 23s. 4d. what is it per lb.?
Anſ. 2½d.
3. When 2 cwt. of ſugar coſt £.8 17 4 what is it per lb.?
Anſ. 9½d.
4. If 5 cwt. of iron coſt £.8 15 0 how much is it per lb.?
Anſ. 3¼d.
5. If 4 cwt. of tobacco coſt £.14 9 4 what is it per lb.?
Anſ. 7¼d.

6. A mate and 3 ſeamen have to receive 600 dollars, for recapturing their veſſel, of which the mate is to have 2 ſhares, and each ſeaman one ſhare; how much is the part of each?
Anſ. the mate's part is 240 dols.
and each ſeaman's 120.

7. Capt. M. of the Jaſon, meets at ſea with the wreck of the Hawk, of Boſton, from which he takes ſundry articles, which ſell for 521 dollars 64 cents: two-thirds of this ſum is awarded to the owners of the Hawk; of the other ⅓ the owners of the Jaſon are to have ½, and the remainder is to be divided between the captain, mate, and nine ſeamen, allowing the captain 3 ſhares, the mate 2, and the ſeamen 1 ſhare each; what is the reſpective part of thoſe concerned?

	dols.	cts.
Anſ. the owners of the Hawk	347	76
owners of the Jaſon	86	94
captain	18	63
mate	12	42
each ſeaman	6	21

DECIMAL FRACTIONS.

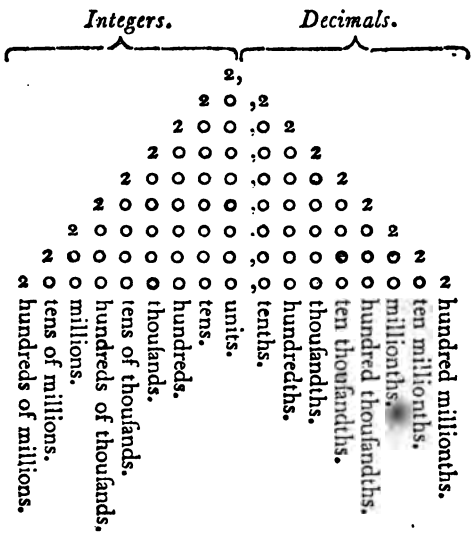
A DECIMAL FRACTION is that, whoſe denominator is an unit, with as many cyphers annexed to it as the numerator has places, and is uſually expreſſed by writing the numerator only, with a point before it, called the ſeparatrix; thus $\frac{5}{10}$, $\frac{25}{100}$, $\frac{125}{1000}$, are decimal fractions, and are expreſſed by ,5 ,25 ,125 reſpectively.

The figures to the left hand of the ſeparatrix are whole numbers; thus 4,5 yards is 4 yards and 5 tenths or one half of another yard.

Cyphers placed to the right hand of decimals, make no alteration in their value; for ,5 ,50 ,500 &c. are decimals of the ſame value, being each equal to $\frac{1}{2}$; but when placed to the left hand, the value of the fraction is decreaſed in a tenfold proportion; thus ,5 ,05 ,005 &c. are 5 tenth parts, 5 hundredth parts, 5 thouſandth parts, reſpectively.

But the different value of figures will appear plainer by the following

TABLE.



From this table it appears, that as whole numbers increaſe in a tenfold proportion from units to the left hand, ſo decimals decreaſe in the ſame proportion to the right,—and that in decimals, as in whole numbers, the place of a figure determines its relative value.

ADDITION OF DECIMALS.

RULE. Place the given numbers ſo that the decimal points may ſtand directly under each other, then add as in whole numbers, and point off ſo many places for decimals to the right as are equal to the greateſt number of the decimal places in any of the given numbers.

EXAMPLES.

263,51	42,23	2,1
149,28	18,47	,5
293,53	9,3	26,17
184,59	52,384	,7
129,4	2,1	5,
1020,31	124,484	34,47

Required the ſum of twenty-nine and three tenths, three hundred and ſeventy-four and nine millionths, ninety-ſeven and two hundred and fifty-three thouſandths, three hundred and fifteen and four hundredths, twenty-ſeven, one hundred and four tenths.

Anſ. 942,993009.

Required the ſum of Ten dollars and twenty-nine cents, Ninety-three cents and three mills, Nine cents and ſix mills, and Two dollars eight mills. Anſ. 13 dols. ,32 cts. 7 mills.

SUBTRACTION OF DECIMALS.

RULE. Place the given numbers ſo that the decimal points may ſtand directly under each other, and then point off the decimal places as in addition.

EXAMPLES.

From	219,42	87,26	57	311
Take	184,38	19,4	9,375	11,11
	35,04	67,86	47,625	299,89

From two thouſand and ſixteen hundreths take one thouſand and four, and four millionths. Anſ. 996,159996.

From twenty-four thouſand nine hundred and nine and one tenth take fourteen thouſand and twenty-nine thouſandths. Anſ. 10909,071.

Take eighty-five and ſeven hundred and thirty-ſeven thouſandths from one hundred. Anſ. 14,263.

From five hundred and thirty-one dollars two cents take one hundred and ſeventeen dollars three cents and four mills.

Anſ. 413 *dols.* 98 *cts.* 6 *m.*

MULTIPLICATION OF DECIMALS.

Multiply exactly as in whole numbers, and from the product cut off as many figures for decimals to the right hand as there are decimals in both the factors, but if the product should not have so many, supply the defect by prefixing cyphers.

EXAMPLES.

Multiply	36,5	29,831	3,92
by	7,27	,952	196
	2555	59662	2352
	730	149155	3528
	2555	268479	392
Product	265,355	28,399112	768,32

Multiply	,285	,285	,29	124
by	,8	,003	,1	,06
Product	,2280	,000855	,029	7,44

NOTE. To multiply decimal fractions by 10, 100, 1000, &c. is only to remove the separatrix so many places towards the right as there are cyphers.

Thus, 7,362937 multiplied by { 10, 100, 1000, 10000 } is { 73,62937, 736,2937, 7362,937, 73629,37 }

Multiply twenty-nine and three tenths by seventeen.
Ans. 498,1.

Multiply twenty-seven thousandths by four hundreths.
Ans. ,00108.

Multiply two thousand and four and two tenths by twenty-seven.
Ans. 54113,4.

PRACTICAL QUESTIONS.

1. How much will 93 yards of shalloon come to at 53 cents per yard?

93
,53
279
465
49,29 Ans. 49 dolls. 29 cents.

2. At 21 cents 9 mills per lb. what will 187lb. of Coffee come to? Anſ. 40 dols. 95 cts. 3 m.

3. What will 27 cwt. of Iron come to at 4 dollars 56 cents per cwt.? Anſ. 123 dols. 12 cts.

4. How much will 281 yards of tape come to at 9 mills per yard? Anſ. 2 dols. 52 cts. 9 m.

5. What will 371 yards of broadcloth come to at 5 dols. 79 cts. per yard? Anſ. 2148 dols. 9 cts.

6. How much will 29½ yards of mode come to at 75 cents per yard? Anſ. 22 dols. 12 cts. 5 m.

7. What will 23,625 feet of boards come to at 8 dollars 25 cents per M.?

23,625
8,25

118125
47250
189000

194,90625 Anſ. 194 dols. 90 cts. 6 m.

8. How much will 712 feet of boards come to, at 14 dollars per thouſand? Anſ. 9 dols. 96 cts. 8 m.

9. What will 25,650 feet of clear boards come to, at 17dols. 50 cts. per thouſand? Anſ. 448 dols. 87 cts. 5 m.

		Dols.	*Cts.*		*Dols.*	*Cts.*	*M.*
10.	15,859 feet clear boards	17	50	per M.	277	53	2
11.	812 do.	14			11	36	8
12.	376 do.	12	75		4	79	4
13.	31,496 merchantable do.	8			251	96	8
14.	269 do.	6	75		1	81	5
15.	4,114 refuſe do.	3	37		13	86	4
16.	393 maple do.		8	per foot	31	44	
17.	57 mahogany		32	do.	18	24	
18.	195 gallons molaſſes		57	per gallon	111	15	
19.	189 do. rum		93		175	77	
20.	243 yards baize		23	per yard	55	89	
21.	197 feet clear boards		2	per foot	3	94	

DIVISION OF DECIMALS.

RULE. Divide as in whole numbers, and from the right hand of the quotient point off as many places for decimals as the decimal places in the dividend exceed thoſe of the diviſor. If the places of the quotient are not ſo many as the rule requires, ſupply the defect by prefixing cyphers. If at any time there be a remainder, or the decimal places in the diviſor are more than thoſe in the dividend, cyphers may be annexed to the dividend, and the quotient carried to *degree of* exactneſs.

EXAMPLE.

```
92),863972(,009391        ,853)89,000 (104,337, &c.
  828                          853
  ---                          ---
  359                         3700
  276                         3412
  ---                         ----
   837                        2880
   828                        2559
   ---                        ----
    92                        3210
    92                        2559
    --                        ----
                              6510
                              5971
                              ----
                               539
```

The various kinds that ever occur in diviſion are included in the following caſes, viz.

Divide	,803	by ,22	Anſ. 3,65
	,803	2,2	,365
	,803	22	,0365
	80,3	,22	365
	80,3	2,2	36,5
	80,3	22	3,65
	222	,365	608,21+
	222	3,65	60,821+
	222	365	,60821+

As multiplying by 10, 100, 1000, &c. is only removing the ſeparating point of the multiplicand ſo many places to the right hand as there are cyphers in the multiplier, ſo to divide by the ſame, is only removing the ſeparatrix, in the ſame manner, to the left.

PRACTICAL QUESTIONS.

1. When butter is ſold at 12 cents 8 mills per lb. how many lb. may be bought for 224 dollars?

```
,128)224,000(1750
     128
     ---
     960
     896
     ---
     640
     640          Anſ. 1750lb.
     ---
```

Here the cyphers annexed to the dividend being equal to the decimal places in the diviſor, the quotient is a whole number.

2. If 673 bushels of wheat cost 786 dols. 73 cts. 7 m. what is it per bushel?

673)786,737 (1,169
673
1137
673
4643
4038
6057
6057

Ans. 1 dol. 16 cts. 9 m.

In this example, as the divisor is a whole number, three places are pointed off in the quotient, to equal those in the dividend.

3. If 493 yards cost 4 dols. 43 cts. 7 mills, what is it per yard?
Ans. 9 mills.

4. If 125 gallons of molasses cost 95 dollars, what is 1 gallon worth? Ans. 76 cents.

5. If 205 yards of durant cost 107 dollars 62½ cents, what is it per yard? Ans. 52½ cents.

REDUCTION OF DECIMALS.

CASE I.

To reduce a vulgar fraction to its equivalent decimal.

RULE. Divide the numerator by the denominator, and the quotient will be the decimal required.

EXAMPLES.

1. Reduce $\frac{3}{4}$ to a decimal.

4)3,00

Ans. ,75

2. What is the decimal of $\frac{1}{2}$? Ans. ,5
3. What is the decimal of $\frac{1}{4}$? Ans. ,25
4. What is the decimal of $\frac{3}{20}$? Ans. ,15
5. What is the decimal of $\frac{17}{25}$? Ans. ,68
6. Express $\frac{7}{8}$ decimally. Ans. ,875

Case II.

To reduce numbers of different denominations to their equivalent decimal values.

Rule. 1. Write the given numbers perpendicularly under one another for dividends, proceeding orderly from the leaſt to the greateſt.

2. Oppoſite to each dividend, on the left hand, place ſuch a number for a diviſor as will bring it to the next ſuperior name, and draw a line between them.

3. Begin with the higheſt, and write the quotient of each diviſion, as decimal parts, on the right hand of the dividend next below it, and the laſt quotient will be the decimal ſought.

Examples.

1. Reduce 14*s.* 5½*d.* to the decimal of a pound.

4	2
12	5,5
20	14,4583

Anſ. ,7229

2. Reduce 15 ſhillings to the decimal of a pound. Anſ. ,75
3. Reduce 3 qrs. 18 lb. to the decimal of a cwt. Anſ. ,910714+
4. Reduce 2 qrs. 2 nails to the decimal of a yard. Anſ. ,625
5. Reduce 14 gals. 3 quarts to the decimal of a hogſhead. Anſ. ,2341+

Case III.

To find the decimal of any number of ſhillings, pence and farthings, by inſpection.

Rule. Write half the greateſt even number of ſhillings for the firſt decimal figure, and let the farthings, in the given pence and farthings, poſſeſs the ſecond and third places; obſerving to increaſe the ſecond place by 5, if the ſhillings be odd, and the third place by 1, when the farthings exceed 12, and by 2 when they exceed 37.

Examples.

1. Find the decimal of 13*s.* 9¼*d.* by inſpection.

,6	half of 12*s.*
5	for the odd ſhilling
39	farthings in 9¼*d.*
2	for exceſs of 37
,691	

2. Find by inſpection the decimal of 15*s.* 8¼*d.* 9*s.* 3½*d.* 19*s.* 6½*d.* 3*s.* 6*d.* and 2*s.* 11½*d.* Anſ. ,784 ,465 ,978 ,175 ,148.

Case IV.

To find the value of any given decimal in the terms of the integer.

Rule. 1. Multiply the decimal by the number of parts in the next leſs denomination, and cut off as many places for the remainder to the right hand as there are places in the given decimal.

2. Multiply the remainder by the parts in the next inferior denomination, and cut of a remainder as before.

3. Proceed in this manner through all the parts of the integer, and the ſeveral denominations, ſtanding on the left hand, make the anſwer.

Examples.

1. Find the value of ,691 of a pound.

```
,691
 20
------
13,820
 12
------
9,840
 4
------
3,360      Anſ. 13s. 9¼d.
```

2. What is the value of ,9 of a ſhilling? Anſ. 10¼d.

3. What is the value of ,592 of cwt.?
Anſ. 2 qrs. 10 lb. 4 oz. 13+ drs.

4. What is the value of ,258 of a tun of wine?
Anſ. 1 hhd. 2+ galls.

5. What is the value of ,12785 of a year?
Anſ. 46 days 15 hrs. 57 m. 57+ ſc.

TABLE I.

ENGLISH COIN.
£.1 the Integer.

Sh.	dec.	Sh.	dec.
19	,95	9	,45
18	,9	8	,4
17	,85	7	,35
16	,8	6	,3
15	,75	5	,25
14	,7	4	,2
13	,65	3	,15
12	,6	2	,1
11	,55	1	,05
10	,5		

Pence.	Decimals.
6	,025
5	,020833
4	,016666
3	,0125
2	,008333
1	,004166

Farth.	Decimals.
3	,003125
2	,0020833
1	,0010416

TABLE II.

ENG. COIN. 1 *Shill.*
Long Meaſ. 1 *Foot.*
The Integer.

Pence. and Inches.	Decimals.
6	,5
5	,416666
4	,333333
3	,25
2	,166666
1	,083333

Farth.	Decimals.
3	,0625
2	,041666
1	,020833

TABLE III.

TROY WEIGHT.
1 *lb.* the Integer.

Ounces the ſame as Pence in the laſt Table.

Penny weight.	Decimals.
10	,041666
9	,0375
8	,033333
7	,029166
6	,025
5	,020833
4	,016666
3	,0125
2	,008333
1	,004166

Grains.	Decimals.
12	,002083
11	,001910
10	,001736
9	,001562
8	,001389
7	,001215
6	,001042
5	,000868
4	,000694
3	,000521
2	,000347
1	,000173

1 Oz. the Integer.
Pennyweight the ſame as Shillings in the firſt Table.

Grains.	Decimals.
12	,025
11	,022916
10	,020833
9	,01875
8	,016666
7	,014583
6	,0125
5	,010416
4	,008333
3	,00625
2	,004166
1	,002083

TABLE IV.

AVOIRDUP. WT.
112 *lb.* the Integer.

Qrs.	Decimals.
3	,75
2	,5
1	,25

Pounds.	Decimals.
14	,125
13	,116071
12	,107143
11	,098214
10	,089286
9	,080357
8	,071428
7	,0625
6	,053571
5	,044643
4	,035714
3	,026786
2	,017857
1	,008928

Ounces.	Decimals.
8	,004464
7	,003906

6	,003348
5	,002790
4	,002232
3	,001674
2	,001116
1	,000558

¼ *Oz.*	*Decimals.*
3	,000418
2	,000279
1	,000139

TABLE V.

AVOIRDUPOIS WT.

1 *lb.* the Integer.

Oz.	*Decimals.*
8	,5
7	,4375
6	,375
5	,3125
4	,25
3	,1875
2	,115
1	,0625

Drm.	*Decimals.*
8	,03125
7	,027313
6	,023437
5	,019531
4	,015625
3	,011718
2	,007812
1	,003906

TABLE VI.

LIQUID MEASURE.

1 *Tun* the Integer.

Gals.	*Decimals.*
100	,396825
90	,357141
80	,317460
70	,27
60	,238095
50	,198412
40	,158730
30	,119047
20	,079365
10	,039682
9	,035714
8	,031746
7	,027
6	,023809
5	,019841
4	,015873
3	,011904
2	,007936
1	,003968

Pints.	*Decimals.*
4	,001984
3	,001488
2	,000992
1	,000496

A Hogshead the Integer.

Gals.	*Decimals.*
30	,476190
20	,317460
10	,158730
9	,142857
8	,126984
7	,111111
6	,095238
5	,079365
4	,063492
3	,047619
2	,031746
1	,015873

Pints.	*Decimals.*
3	,005952
2	,003968
1	,001684

TABLE VII.

MEASURE.

Liquid. 1 *Gallon.* *Dry.* 1 *Quarter.*

Integer.

Pt.	*Decim.*	*Bu.*
4	,5	4
3	,375	3
2	,25	2
1	,125	1

Q.pt.	*Decim.*	*Pk.*
3	,09375	3
2	,0625	2
1	,03125	1

Decimals.	*Q.pks.*
,0234375	3
,015625	2
,0078125	1

Decimals.	*Pts.*
,005859	3
,003906	2
,001953	1

TABLE VIII.

LONG MEASURE.

1 *Mile* the Integer.

Yards.	*Decimals.*
1000	,568182
900	,511364
800	,454545
700	,397727
600	,340909

Yards.	*decimals.*
500	,284091
400	,227272
300	,170454
200	,113636
100	,056818
90	,051136
80	,045454
70	,039773
60	,034091
50	,028409
40	,022727
30	,017045
20	,011364
10	,005682
9	,005114
8	,004545
7	,003977
6	,003409
5	,002841
4	,002273
3	,001704
2	,001139
1	,000568

Feet.	*decimals.*
2	,0003787
1	,0001894

Inches.	*decimals.*
6	,0000947
5	,000079
4	,0000631
3	,0000474
2	,0000319
1	,0000158

TABLE IX.

TIME.

1 *Year* the Integer.

Months the same as Pence in the second table.

Days.	*decimals.*
365	1,000000
300	,821918
200	,547945
100	,273973
90	,246575
80	,219178
70	,191781
60	,164383
50	,136986
40	,109589
30	,082192
20	,054794
10	,027397
9	,024657
8	,021918
7	,019178
6	,016438
5	,013698
4	,010959
3	,008219
2	,005479
1	,002739

1 *Day* the Integer.

Hours.	*decimals.*
12	,5
11	,458333
10	,416666
9	,375
8	,333333
7	,291666
6	,25
5	,208333
4	,166666
3	,125
2	,083333
1	,041666

Minutes.	*decimals.*
30	,020833
20	,013888
10	,006944
9	,00625
8	,005555
7	,004861
6	,004166
5	,003472
4	,002777
3	,002083
2	,001388
1	,000694

TABLE X.

CLOTH MEASURE.

1 *Yard* the Integer.

Quarters the same as Table 4.

Nails.	*decimals.*
2	,125
1	,0625

TABLE XI.

LEAD WEIGHT.

1 *Fother* the Integer.

Hund.	*decimals.*
10	,512820
9	,461538
8	,410256
7	,358974
6	,307692
5	,256410
4	,205128
3	,153846
2	,102564
1	,051282

Qrs.	*decimals.*
2	,025641
1	,012820

Pounds.	*decimals.*
14	,0064102
13	,0059523
12	,0054915
11	,0050366
10	,0045787
9	,0041208
8	,0036630
7	,0032051
6	,0027472
5	,0022893
4	,0018315
3	,0013736
2	,0009157
1	,0004578

The Single Rule of Three Direct.

THE Single Rule of Three Direct teaches, from three numbers given, to find a fourth, that ſhall be in the ſame proportion to the third as the ſecond is to the firſt.

If *more* require *more*, or *leſs* require *leſs*, the proportion is direct.

RULE. 1. Make the number that is the demand of the queſtion the third term, the number that is of the ſame name or quality, the firſt term, and the remaining number will be the middle term.

Reduce the firſt and third numbers into the ſame, and the ſecond into the loweſt denomination mentioned.

2. Multiply the ſecond and third numbers together, and divide the product by the firſt, and the quotient (if there be no remainder) is the anſwer, or fourth number required.

If, after diviſion, there be remainder, reduce it to the next denomination below that to which the ſecond number was reduced, and divide by the ſame diviſor as before, and the quotient will be of this laſt denomination. Proceed thus with all the remainders till you have reduced them to the loweſt denomination, which the ſecond number admits of, and the ſeveral quotients taken together will be the anſwer required.

The method of proof is by reverſing the queſtion.

EXAMPLES.

1. If 2 yards of cloth coſt 4 ſhillings, what will 125 yds. come to?

yds.	*s.*	*yds.*		*yds.*	*£.*	*s.*	*yds.*	
If 2	: 4	:: 125	Proof if	125	: 12	10	:: 2	
	4				20			
	2)500				250			
	20)250				2			
Anſ.	£.12	10		125)500(4 ſhillings.				
				500				

2. If 1 buſhel of corn coſt 75 cents, what will 257 buſhels come to?

buſh.	*cts.*	*buſh.*	
If 1	: 75	: : 257	
		75	
		1285	
		1799	
		192,75	Anſ. 192 dols. 75 cts.

3. What will 931 yards of ſhalloon come to at 55 cts. 4 ms. per yard? Anſ. 515 dols. 77 cts. 4 ms.

4. How many buſhels of wheat at 1 dol. 12 cts. per buſhel can I have for 81 dols. 76 cts.? Anſ. 73 buſhels.

5. What will 94 cwt. of iron come to at 4 dols. 97 cts. 2 ms. per cwt.? Anſ. 467 dols. 36 cts. 8 ms.

6. What will 349 lbs. of beef come to at 2*d.* per pound? Anſ. £.2 18 2.

7. At 3*ſ.* per yard what will 59 yards of cloth come to? Anſ. £.8 17 0.

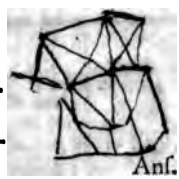
Prove this anſwer to be right.

8. How many lbs. of beef at 5 cts. per lb. may be bought for 29 dols. 85 cts.?

cts. lb. dols. cts.
If 5 : 1 :: 29,85
1

,05)29,85

597 Anſ. 597 lb.



9. How many hogſheads of ſalt at 4 dols. 90 cts. per hhd. can I have for 392 dols.? Anſ. 80 hhds.

10. How many lbs. of Coffee at 1*ſ*7 per lb. may be bought for £.8 12 7? Anſ. 109 lb.

11. When 25 yards of cloth coſt £.2 12 1, what is it per yard?

yd. £. ſ. d. yd.
If 25 : 2 12 1 :: 1
20

52
12

625
1

25)625(12 | 25
50 2*ſ.* 1*d.*

125
125

Anſ. 2*ſ.* 1*d.*

12. If 56 bushels of corn cost 42 dols. 56 cts. what is it per bushel? *bush. dols. cts. bush.*

If 56 : 42,56 :: 1

1

56)42,56(,76

392

336

336

Ans. 76 cts.

13. If 112 pounds of beef cost 18*s.* 8*d.* what is it per lb.?
Ans. 2 pence.

14. If 673 bushels of rye cost 769 dols. 23 cts. 9 mills, what is one bushel worth? Ans. 1 dol. 14 cts. 3 mills.

15. What is one yard of baize worth, when 97 yards cost £.10 12*s.* 2¼*d.*? Ans. 2*s.* 2¼*d.*

16. When iron is sold at 5 dols. 4 cts. per cwt. what is it per pound? Ans. 4 cts. 5 m.

17. If 891 gallons of molasses cost £.176 6 10½, what is it per gallon? Ans. 3*s.* 11½*d.* Prove this answer to be right.

18. What will 253 quintals of fish come to, at 17*s.* 6*d.* per quintal? Ans. £.221 7 6

19. At 5 dols. 50 cts. per thousand, what will 37 thousand of boards come to? Ans. 203 dols. 50 cts.

20. What will 4 hhds. of rum come to, containing viz. 79½, 84, 101½, and 112 gallons, at 6*s.* 9*d.* per gallon? Ans. £.127 4 9

21. What will 327 hhds. of salt come to, at 5 dollars 25 cents per hhd.? Ans. 1716 dols. 75 cts.

22. If 3 and 4 make 6, how many will 6 and 8 make?
Ans. 18.

23. If a chest of Hyson tea, weighing 79 lb. neat, cost £.32 11 9 what is it per lb.? Ans. 8*s.* 3*d.*

24. B owes £.2119 17 6 and he is worth but £.1324 18 5½; if he delivers this to his creditors, how much do they receive on the pound? Ans. 12*s.* 6*d.*

25. A owes B £.5000 6 8, but failing in trade, he is able to pay but 15*s.* 6*d.* on the pound: how much is A to receive, and what is his loss?
Ans. he is to receive £.441 4 8
His loss is 128 2 0

26. A merchant failing in trade, owes in all 2[illegible]5 dollars, and delivers up his whole property, worth 21[illegible] dollars 5 cents; how much per cent does he pay, and what is B's loss to whom he owed 225 dollars?
He pays 9 dols. 25 cts. per cent.
B's loss 83 dols. 33 cts.

27. How much will 4 cwt. 1 qr. 19 lb. of butter come to at 9*d.* per lb.?

lb.
400 = 4 hundred.
48 = excefs, 12 per cent.
28 = 1 quarter.
19

lb. *d.*
If 1 : 9 :: 495
9

12)4455

20)371 3

Anf. £.18 11*s.* 3*d.*

28. If 3 qrs. 26 lb. of ſteel coſt 13 dols. 20 cts. what is it per pound? Anf. 12 cents.

29. If 16 cwt. 3 qrs. of ſteel coſt 157 dollars 45 cents, what is 1 qr. worth? Anf. 2 dols. 35 cts.
Prove this anſwer to be right.

30. A captain of a ſhip is provided with 18000 lb. of bread for 150 ſeamen, of which each man eats 4 lb. per week, how long will it laſt them? Anf. 30 weeks.

31. How long would 2295 lb. of beef laſt for 45 ſeamen, if they get 1 lb. each, and that three times a week? Anf. 17 weeks.

32. Suppoſe 120 ſeamen are provided with 7200 gallons of water for a cruiſe of 4 months, each month 30 days; how much is each man's ſhare per day? Anf. 2 quarts.

33. A ſhip's company of 16 men is on an allowance of 6 ounces of bread per day, when meeting with a veſſel from which they are ſupplied with 2 cwt. of bread, what addition will this make to their daily allowance, if they ſuppoſe their voyage to laſt 28 days.
Anf. 8 ounces.

34. If 17 tuns 2 hhds. of wine coſt 5468 dols. 40 cts. how much is one pint worth? Anf. 15 cts. 5 mills.

35. How much will 4 pieces of linen, containing viz. 35½, 36, 37½ and 38 yards come to, at 79 cts. per yard?
Anf. 116 dollars 13 cents.

36. How many crowns of 110 cents each will pay a debt of £.82 16*s.* 7*d.*? Anf. 251 crowns.

37. If 203 tons 9 cwt. 3 qrs. 3 lb. of tallow coſt £.4558 3 0 what does 1 ton coſt. Anf. £.22 8 0

38. How many cwt. of rice may be bought for 487 dols. 50 cts. when 7lb. coſt 25 cents. Anf. 121 cwt. 3 qrs. 14 lb.

39. When 9 dols. 36 cts. is paid for 2 qrs. 22 lb. of ſugar, what is 7 lb. worth? Anf. 84 cts.

40. When 47 cwt. 3 qrs. of ſugar coſt £.182 4 11, what is one quarter worth? Anſ. 19*s.* 1*d.*

41. If 6 lb. 6 oz. Avoirdupois coſt 5 dols. 10 cts. what is it per ounce? Anſ. 5 cents.

42. Bought 40 tubs of butter, weighing 36 cwt. 2 qrs. 14 lb. neat, for 472 dols. 2 cents; paid cooperage 12 cts. per tub; ſalt and labour 4 dols. 83 cts. 8 mills; ſtoreage 6 dols. 48 cts.—I would know what it ſtands me in per lb. Anſ. 11 cts. 9 mills.

43. How much will a grindſtone, 32 inches diameter and 6 inches thick, come to, at 5*s.* per cubic foot?

See Reduction, cubic meaſure.

32 the diameter.
16 = half the diameter.

48
16

288
48

768
6

4608

inch.	*s.*			
If 1728	: 5	: :	4608	Anſ. 13*l.* 4*d.*

44. What will a grindſtone, 28 inches diameter and 3½ inches thick, come to, at 1 dol. 90 cts. per cubic foot. Anſ. 2 dols. 26 c.

45. When a man's yearly income is 949 dollars, how much is it per day? Anſ. 2 dols. 60 cts.

46. At 4½ per cent, what is the commiſſion on 1525 dollars? Anſ. 68 dols. 62 cts. 5 mills.

47. What is the intereſt of 456 dols. for 1 year, at 6 per cent? Anſ. 27 dols. 36 cts.

48. At 5 dolls. 50 cts. per M. what will 21,186 feet boards come to? Anſ. 116 dols. 52 cts. 3 m.

49. When boards are ſold at 18 dols. per M. what is it per foot? Anſ. 1 cent 8 mills.

50. What will 98 feet of boards come to at 4 cents per foot? Anſ. 3 dols. 92 cents.

51. What will 49 thouſand 3 hundred and 25 caſts of ſtave come to, at 17 dollars per thouſand?

NOTE. Staves are counted by caſting three at a time; 40 caſts make 1 hundred, and 10 hundred 1 thouſand.

	M.	*dols.*		*M.*	*h.*	*c.*	
If	1	: 17	: :	49	3	25	
	10			10			
	10			493			
	40			40			
Caſts	400			19745			dols. cts. m. Anſ. 839 16 2

52. What will 19 M. 800 and 15 caſts of white oak hhd. ſtaves come to at 31 dols. per M.? Anſ. 614 dols. 96 cts. 2 ms.

53. What will 22 M. 900 and 37 caſts of red oak hhd. ſtaves come to at 13 dls. per M.? Anſ. 298 dols. 90 cts. 2 ms.

54. What will 56 bundles of hoops come to at 25 dols. per M. of 30 bund.?

NOTE. Hoops are ſometimes bound in bundles of 30 hoops each, and four ſuch bundles are 1 hundred, and 10 hundred or 40 bundles, 1 thouſand. But they are generally bound in bundles of 40 each, 3 bundles making 1 hundred, and 10 hundred or 30 bundles, 1 thouſand.

hund.	*dols.*			Or	*bund.*	*dols.*		*bund.*
If 10	: 25	: :	18⅔ hundreds		30	: 25	: :	56
			25					25
			90					280
			36					112
			16⅔					
			10)46\|66⅔					30)1400
			46,66⅔					46,66⅔

Anſ. 46 dols. 6⅔ dimes, or 66⅔ cts.

55. How many buſhels of ſalt, at 4 dolls. 75 cts. per hhd. can I have for 326 dollars?

Dls. cts.		*buſh.*		*dls.*		
If 4 75	:	8	: :	326	Anſ.	549 buſhels, when meaſured on board the veſſel.
If 4 75	:	7½	: :	326	Anſ.	514 buſhels 3 pecks, nearly, when meaſured aſhore.

56. What is the tax on lands, &c. valued at 2957 dollars, in the direct tax, at 28 cents and 3 mills on the hundred dollars?

Anſ. 8 dols. 36 cts. 8 m.

57. What is the tax on a houſe, valued at 900 dollars, in the direct tax, at $\frac{3}{100}$ per cent.?

dols.		*dols.*		*dols.*
If 100	:	,3	: :	900
				,3
				100)270.0

Anſ. 2 dols. 70 cts.

Or, As $\frac{3}{100}$ per cent. is equal to 3 mills on the dollar, multiplying the ſum in dollars by 3, gives the anſwer in mills.

EXAMPLE.

58. What is the tax on 753 dollars at $\frac{3}{10}$ per cent.?

753 dollars
3 mills

2259 mills. Anſ. 2 dols. 25 cts. 9 m.

59. Find the tax on the following ſums,

	dols.		*dols.*	*cts.*
viz.	1550	at $\frac{4}{10}$ per cent.	Anſ. 6	20
	4560	$\frac{5}{10}$	22	80
	7850	$\frac{6}{10}$	47	10
	12680	$\frac{7}{10}$	88	76
	16950	$\frac{8}{10}$	135	60
	24620	$\frac{9}{10}$	221	58
	35840	1	358	40

60. What will a piece of land, meaſuring 48 feet in length and 40 feet in width at each end, amount to at 20 dols. per ſquare rod?

feet.
48
feet. *dols.* 40

If 272½ : 20 : : 1920

By decimals. Anſ. 141 dols. 4 cts.

If 272,25 : 20 : : 1920

61. A charter party for a veſſel of 186 tons commenced on 28th of May, and ended on the 10th of October following: What does the hire amount to for that time, at 2 dols. per ton per month of 30 days.

	days.
May	4
June	30
July	31
Auguſt	31
Septem.	30
October	10
	136

186 tons.
2 dols. per mo.

days.
If 30 : 372 : : 136
135

2232
1116
372

30 | 50592

1686.40 Anſ. 1686 dols. 40 cts.

In calculating the time, the days of receiving and diſcharging the veſſel are both included.

INVERSE PROPORTION.

Whereas in the Rule of Three Direct, more requires more, and leſs requires leſs, in this rule more requires leſs and leſs requires more.

Rule. After ſtating the terms as in the Rule of Three Direct, multiply the firſt and ſecond terms together, and divide the product by the third, and the quotient is the anſwer.

1. If 100 workmen complete a piece of work in 12 days, how many are ſufficient to do it in 3 days?

d.		*m.*		*d.*
12	:	100	: :	3
		12		
		3)1200		
		400		

Anſ. 400 men.

2. If 8 boarders drink a barrel of cider in 12 days, how long would it laſt if 4 more came among them? Anſ. 8 days.

3. A ſhip's company of 15 perſons is ſuppoſed to have bread to laſt their voyage, allowing each 8 ounces per day—when they pick up a crew of 5 perſons in diſtreſs, to whom they are willing to communicate, what will the daily allowance of each perſon then be?

Anſ. 6 ounces.

4. When wheat is ſold at 93 cents per buſhel, the penny loaf weighs 12 ounces—what muſt it weigh when the wheat is 1 dollar 24 cents per buſhel? Anſ. 9 ounces,

5. How many yards of baize, 3 quarters wide, will line a cloak, which has in it 12 yards of camblet, half yard wide?

Anſ. 8 yards.

6. Suppoſe 400 men in a garriſon are provided with proviſions for 30 days, how many men muſt be ſent out, if they would have the proviſions laſt 50 days. Anſ. 160 men.

7. What ſum ſhould be put to intereſt to gain as much in 1 month as 127 dollars would gain in 12 months? Anſ. 1524 dols.

COMPOUND PROPORTION.

Compound Proportion teaches to reſolve ſuch queſtions, as require two or more ſtatings by ſimple proportion.

Rule. State the queſtion, by placing the three conditional terms in this order: that which is the principal cauſe of gain, loſs, or action, poſſeſſes the firſt place; that which denotes ſpace of time or diſ

of place, the ſecond; and that which is the gain, loſs, or action, t
third; then place the other two terms, which move the queſtio
under thoſe of the ſame name, and if the blank place fall under t
third, multiply the three laſt terms for a dividend, and the two f
for a diviſor: but if the blank fall under the firſt or ſecond pla
multiply the firſt, ſecond, and laſt terms together for a dividend, a
the other two for a diviſor; and the quotient will be the anſwer.

EXAMPLES.

1. If £.100 in 12 months gain £5, how much will £400 g
in 3 months?

£.		mo.		£.
100	:	12	::	5
400	:	3		
3				

100 1200
12 5

12|00)60|00

£.5 Anſ. £.5

2. If 8 men make 24 rods of wall in 6 days, how many men w
build 18 rods in 3 days?

m.		d.		r.
8	:	6	::	24
		3	::	18
				6

24 108
3 8

72)864(12
72
144
144
—

Anſ. 12 men.

3. If a ſmith of 3 partners ſpend 450 dollars in 5 months, h
much would be neceſſary to maintain them 8 months, if five m
were added to the ſmith. Anſ. 1120 dollars.

4. What is the intereſt of £.240 for 50 days at 5 per cent. per annum?

£.		days.		£.
100	:	365	::	5
240	:	50		
50				

100 12000
365 5

365|00)600|00(1 12 10¼
365
235
20
365)4700(12
4380
320
12
365)3840(10
3650
190
4
365)760(2
730
30

Anſ. £.1 12 10¼

N. B. By omitting to multiply by the rate per cent. and dividing 36500 by it, are found the fixed diviſors of 7300 for 5, and 6083 for 6, per cent. per annum, ſometimes uſed in calculating intereſt.

5. What is the intereſt of 654 dollars for 164 days, at 6 per cent. per annum?

100
365

6)36500

6083 the fixed diviſor, found as above directed.

654 dollars.
164

2616
3924
654

6083)107256(17,632
6083

46426
42581

38450
36498

19520
18249

12710
12166

544 anſ. 17dls.63cts.2m.

6. What is the intereſt of 947 dollars, for 294 days, at 5 per cent. per annum?

947 *dols.*
294

3788
8523
1894

Fixed diviſor 7300)278418(38,139
21900

59418
58400

10180
7300

28800
21900

69000
65700

3300 Anſ. 38 dols. 13 cts. 9 m.

VULGAR FRACTIONS.

FRACTIONS, or broken numbers, are expreſſions for any aſſignable parts of an unit; and are repreſented by two numbers, placed one above the other, with a line drawn between them.

The number above the line is called the *numerator*, and that below the line the *denominator*.

The denominator ſhews how many parts the integer is divided into, and the numerator ſhews how many of thoſe parts are meant by the fraction.

Fractions are either proper, improper, compound, or mixed.

1ſt. A *proper fraction* is when the numerator is leſs than the denominator, as $\frac{1}{2}$, $\frac{2}{3}$, $\frac{9}{11}$, $\frac{5}{96}$, &c.

2d. An *improper fraction* is when the numerator is either equal to, or greater than, the denominator, as $\frac{8}{8}$. $\frac{11}{9}$, $\frac{12}{11}$, $\frac{25}{25}$, &c.

3d. A *compound fraction* is a fraction of fractions, and known by the word *of*, as $\frac{1}{2}$ of $\frac{2}{3}$. $\frac{7}{9}$ of $\frac{9}{10}$, $\frac{15}{16}$ of $\frac{24}{25}$, &c.

4th. A *mixed number* or *fraction* is compoſed of a whole number and fraction, as $8\frac{2}{7}$, $17\frac{1}{2}$, $29\frac{1}{4}$, &c.

I. *To reduce a ſimple fraction to its loweſt terms.*

RULE. Find a common meaſure by dividing the lower term by the upper, and that diviſor by the remainder, continuing till nothing remains; the laſt diviſor is the common meaſure; then divide both parts of the fraction by the common meaſure, the quotients expreſs the fraction required.

NOTE. If the common meaſure happens to be 1, the fraction is already in its loweſt term; and when a fraction hath cyphers at the right hand, it may be abbreviated by cutting them off, as $\frac{4}{5}|\frac{0}{0}$.

EXAMPLE.

1. Reduce $\frac{91}{117}$ to its loweſt term.

91)117(1
91
26)91(3
78
Common meaſure 13)26(2
26

$13)\frac{91}{117}(\frac{7}{9}$ the anſwer.

Or, divide the terms of the fraction by any number that will divide them without a remainder; divide the quotients in the ſame manner, and ſo on till no number will divide them both, and the laſt quotients expreſs the fraction in its loweſt terms.

EXAMPLE.

2. Reduce $\frac{192}{576}$ to its loweſt terms.

$$\frac{192}{576}=\frac{24}{72}=\frac{3}{9}=\frac{1}{3}$$ the anſwer.
(8) (8) (3)

3. Reduce $\frac{144}{216}$ to its loweſt terms. Anſ. $\frac{2}{3}$.

4. Reduce $\frac{114}{285}$ to its loweſt terms. Anſ. $\frac{2}{5}$.

5. Reduce $\frac{816}{1512}$ to its loweſt terms. Anſ. $\frac{17}{31}$.

II. *To reduce a mixt number to an improper fraction.*

RULE. Multiply the whole numbers by the denominator of the fraction, and to the product add the numerator for a new numerator, and place it over the denominator.

NOTE. To expreſs a whole number fraction-wiſe, ſet 1 for a denominator to the given number.

EXAMPLES.

1. Reduce $5\frac{3}{8}$ to an improper fraction.

$5\times 8+3=\frac{43}{8}$ the anſwer.

2. Reduce $183\frac{5}{11}$ to an improper fraction. Anſ. $\frac{2014}{11}$

3. Reduce $27\frac{3}{9}$ to an improper fraction. Anſ. $\frac{246}{9}$

4. Reduce $514\frac{5}{16}$ to an improper fraction. Anſ. $\frac{8229}{16}$

III. *To reduce an improper fraction to its proper terms.*

RULE. Divide the upper term by the lower, and the quotient will be the whole number; the remainder, if any, will be the numerator to the fractional part.

EXAMPLES.

1. Reduce $\frac{17}{5}$ to its proper terms.

5)17($3\frac{2}{5}$ the anſwer.
15

2

2. Reduce $\frac{243}{9}$ to its proper terms. Anſ. $27\frac{3}{9}$

3. Reduce $\frac{8229}{16}$ to its proper terms. Anſ. $514\frac{5}{16}$

IV. *To find the leaſt common multiple or denominator.*

RULE. Divide the given denominators by any number that will divide two or more of them without a remainder, and ſet the quotients and the undivided numbers underneath. Divide theſe quo-

tients and undivided numbers by any number that will divide two or more of them as before, and thus continue till no two numbers are left capable of being leſſened.

Multiply the laſt quotients and the diviſor or diviſors together, and the product will be the leaſt common denominator required.

EXAMPLES.

1. What is the leaſt common meaſure of $\frac{5}{8}$, $\frac{7}{8}$, $\frac{6}{15}$ & $\frac{3}{16}$?

8)9 8 15 16

3)9 1 15 2

3 1 5 2

$3\times5\times2=30\times3\times8=720$ anſ.

2. What is the leaſt number that can be divided by the nine digits without a remainder? Anſ. 2520

V. *To reduce vulgar fractions to a common denominator.*

RULE. Find a common denominator by the laſt caſe, in which divide each particular denominator, and multiply the quotient by its own numerator, for a new numerator, and the new numerators being placed over the common denominator, expreſs the fractions required in their loweſt terms.

EXAMPLES.

1. Reduce $\frac{3}{4}$, $\frac{5}{9}$ & $\frac{7}{12}$ to a common denominator.

36 the com. denom.

4	$9\times3=27$
9	$4\times5=20$
12	$3\times7=21$

The fractions will be $\frac{27}{36}$, $\frac{20}{36}$, $\frac{21}{36}$.

2. Reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{6}$ & $\frac{7}{8}$ to a common denominator.
Anſ. $\frac{12}{24}$, $\frac{16}{24}$, $\frac{20}{24}$ & $\frac{21}{24}$.

3. Reduce $\frac{2}{3}$, $\frac{4}{9}$, $\frac{3}{7}$ & $\frac{5}{21}$ to a common denominator.
Anſ. $\frac{42}{63}$, $\frac{28}{63}$, $\frac{27}{63}$ & $\frac{15}{63}$.

4. Reduce $\frac{1}{3}$, $\frac{3}{5}$, $\frac{4}{15}$ & $\frac{5}{9}$ to a common denominator.
Anſ. $\frac{15}{45}$, $\frac{27}{45}$, $\frac{12}{45}$ & $\frac{25}{45}$.

VI. *To reduce a compound fraction to a ſingle one.*

RULE. Multiply all the numerators for a new numerator, and all the denominators for a new denominator, then reduce the new fraction to its loweſt term by Caſe I.

EXAMPLES.

1. Reduce $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{9}{10}$ to a ſingle fraction.

$$3\times5\times9=\frac{135}{240}=\frac{9}{16}, \text{ the anſwer.}$$
$$4\times6\times10=240$$

2. Reduce $\frac{5}{9}$ of $\frac{4}{7}$ of $\frac{11}{12}$ to a ſingle fraction. Anſ. $\frac{55}{189}$

3. Reduce $\frac{2}{7}$ of $\frac{5}{9}$ of $\frac{4}{5}$ to a ſingle fraction. Anſ. $\frac{8}{63}$

VII. *To reduce a fraction of one denomination to the fraction of another, but greater, retaining the ſame value.*

RULE. Reduce the given fraction to a compound one, by multiplying it with all the denominations between it and that denomination to which you would reduce it; then reduce that compound fraction to a ſingle one.

EXAMPLES.

1. Reduce $\frac{7}{8}$ of a penny to the fraction of a pound.

$$\frac{7}{8}\times\frac{1}{12}\times\frac{1}{20}=\frac{7}{1920} \text{ the anſwer.}$$
d.

2. Reduce $\frac{5}{8}$ of a pennyweight to the fraction of a pound Troy. Anſ. $\frac{1}{384}$

3. Reduce $\frac{4}{7}$ of a pound Avoirdupois to the fraction of a cwt. Anſ. $\frac{1}{196}$

VIII. *To reduce the fraction of one denomination to the fraction of another, but leſs, retaining the ſame value.*

RULE. Multiply the numerator by the parts contained in the ſeveral denominations between it and that denomination to which you would reduce it for a new numerator, and place it over the denominator of the given fraction.

EXAMPLES.

1. Reduce $\frac{1}{960}$ of a pound to the fraction of a penny.

$$\frac{1\times20\times12=240}{960}=\frac{1}{4} \text{ the anſ.}$$

2. Reduce $\frac{1}{300}$ of a lb. troy to the fraction of a dwt. Anſ. $\frac{4}{5}$.

3. Reduce $\frac{1}{196}$ of a cwt. to the fraction of a lb. Anſ. $\frac{4}{7}$.

IX. *To find the value of the fraction in the known parts of the integer.*

RULE. Multiply the numerator by the known parts of the integer and divide by the denominator.

EXAMPLES.

1. What is the value of $\frac{2}{3}$ of a £. ?

2
20 ſhillings.

3)40

Anſ. 13 4d.

2. What is the value of $\frac{2}{3}$ of a ſhilling ?
Anſ. 4d. 3 qrs. $\frac{1}{3}$.

3. Reduce $\frac{1}{3}$ of a lb. troy to its proper quantity.
Anſ. 7 oz. 4 dwt.

4. Reduce $\frac{4}{5}$ of a mile to its proper quantity.
Anſ. 6 fur. 16 poles.

X. *To reduce any given quantity to the fraction of a greater denomination of the ſame kind.*

RULE. Reduce the given quantity to the loweſt denomination mentioned for a new numerator, under which ſet the integral part (reduced to the ſame name) for a denominator, and it will expreſs the fraction required.

EXAMPLES.

1. Reduce 16*s*. 8*d*. to the fraction of a pound.

16 8
12

200 5
——=— the anſwer.
240 6

2. Reduce 2 quarters $3\frac{1}{2}$ nails to the fraction of an ell Engliſh.
Anſ. $\frac{5}{8}$

3. Reduce 4*s*. $6\frac{1}{2}d$. to the fraction of a pound. Anſ. $\frac{100}{480}$

ADDITION OF VULGAR FRACTIONS.

I. *To add fractions that have a common denominator.*

RULE. Add their numerators together, and place the ſum over one of the given denominators.

EXAMPLES.

1. Add $\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{5}$, $\frac{5}{7}$, and $\frac{7}{9}$ together.

$$\begin{array}{r} 1 \\ 2 \\ 4 \\ 5 \\ 7 \\ \hline 19 \end{array} = 2\tfrac{1}{9} \text{ the anſwer.}$$

2. Add $\frac{7}{24}$, $\frac{11}{24}$, and $\frac{13}{24}$ together. Anſ. $1\frac{7}{24}$.

3. Add $\frac{13}{20}$, $\frac{17}{20}$, and $\frac{9}{20}$ together. Anſ. $1\frac{19}{20}$.

4. Add $\frac{7}{16}$, $\frac{13}{16}$, and $\frac{15}{16}$ together. Anſ. $2\frac{5}{16}$.

II. *To add mixed numbers, whoſe fractions have a common denominator.*

RULE. Add the fractions by the laſt caſe, and the integer as in whole numbers.

EXAMPLES.

1. Add $2\frac{1}{11}$, $3\frac{2}{11}$, $4\frac{4}{11}$ and $7\frac{9}{11}$ together.

$$\begin{array}{r} 2\frac{1}{11} \\ 3\frac{2}{11} \\ 4\frac{4}{11} \\ 7\frac{9}{11} \\ \hline 17\frac{5}{11} \end{array} \text{ Anſwer.}$$

2. Add $13\frac{1}{15}$, $9\frac{4}{15}$, and $3\frac{7}{15}$ together. Anſ. $25\frac{4}{5}$

3. Add $1\frac{1}{12}$, $2\frac{5}{12}$, $3\frac{7}{12}$, and $4\frac{11}{12}$ together. Anſ. 12

4. Add $9\frac{13}{14}$, $7\frac{9}{14}$, $5\frac{5}{14}$, and $8\frac{1}{14}$ together. Anſ. $31\frac{5}{7}$

IV. *To add fractions, having different denominators.*

RULE. Find the leaſt common denominator by Caſe III. in Reduction, in which divide each denominator, and multiply the quotient by its numerator; the ſum of the products is a new numerator to the common denominator, and the fraction required.

EXAMPLES.

1. Add $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, and $\frac{11}{12}$ together.

24 com. denom.

3	$8\times2=16$
4	$6\times3=18$
6	$4\times5=20$
8	$3\times7=21$
12	$2\times11=22$

$\frac{97}{24}=4\frac{1}{24}$, the anſwer.

2. Add $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{7}$, and $\frac{1}{8}$ together. Anſ. $2\frac{41}{280}$

3. Add $\frac{4}{5}$, $\frac{5}{6}$, $\frac{6}{7}$, $\frac{7}{8}$, and $\frac{9}{15}$ together. Anſ. $3\frac{67}{280}$

IV. *To add mixt numbers whoſe fractions have different denominators.*

RULE. Add the fractions as in the laſt caſe, and the integers as in whole numbers.

EXAMPLES.

1. Add $5\frac{2}{3}$, $6\frac{7}{8}$, and $4\frac{1}{2}$ together.

24 com. denom.

$5\frac{2}{3}$	16
$6\frac{7}{8}$	21
$4\frac{1}{2}$	12
Anſ. $17\frac{1}{24}$	$\frac{49}{24}=2\frac{1}{24}$

2. Add $1\frac{3}{5}$, $\frac{4}{5}$ of $\frac{1}{3}$, and $9\frac{3}{10}$ together. Anſ. $11\frac{1}{30}$

3. Add $1\frac{3}{10}$, $6\frac{7}{8}$, $\frac{2}{3}$ of $\frac{1}{2}$, and $7\frac{1}{2}$ together. Anſ. $16\frac{73}{120}$

V. *When the fractions are of ſeveral denominations.*

RULE. Reduce them to their proper quantities by Caſe IX. in Reduction, and add as before.

EXAMPLES.

1. Add $\frac{7}{9}$ of a £. to $\frac{3}{10}$ of a ſhilling.

	s.	d.	15 common meaſure
$\frac{7}{9}$ of a £. =	15	$6\frac{2}{3}$	10
$\frac{3}{10}$ of a S. =	0	$3\frac{3}{5}$	9
Anſ.	15	$10\frac{4}{15}$	$\frac{19}{15} = 1\frac{4}{15}$

2. Add $\frac{2}{3}$ of a yard, $\frac{1}{4}$ of a foot, and $\frac{7}{8}$ of a mile together.
Anſ. 1540 yds. 2 ft. 9 inches.

3. Add $\frac{1}{8}$ of a week, $\frac{1}{4}$ of a day, and $\frac{1}{2}$ of an hour together.
Anſ. 2 d. $14\frac{1}{2}$ h.

SUBTRACTION OF VULGAR FRACTIONS.

I. *To find the difference between ſimple fractions that have a common denominator.*

RULE. Subtract the leſs numerator from the greater, and under the remainder put the denominator.

EXAMPLES.

From	$\frac{5}{7}$	$\frac{11}{12}$	$\frac{15}{16}$	$\frac{17}{35}$	$\frac{105}{209}$
Take	$\frac{2}{7}$	$\frac{5}{12}$	$\frac{3}{16}$	$\frac{13}{35}$	$\frac{99}{209}$
Rem.	$\frac{3}{7}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{4}{35}$	$\frac{6}{209}$

II. *To ſubtract a fraction or mixt number from a whole number.*

RULE. Subtract the numerator from the denominator, and under the remainder put the denominator, and carry one to be deducted from the integer.

EXAMPLES.

From	3	6	10	9	100
Take	$0\frac{3}{16}$	$0\frac{7}{8}$	$0\frac{1}{16}$	$5\frac{1}{2}$	$99\frac{99}{100}$
Rem.	$2\frac{13}{16}$	$5\frac{1}{8}$	$9\frac{15}{16}$	$3\frac{1}{2}$	$0\frac{1}{100}$

III. *To ſubtract ſimple fractions that have no common denominator.*

RULE. By Caſe IV, in Reduction, find a common denominator, in which divide each denominator, and multiply the quotient by its numerator; the difference between the products thus found is a numerator to the common denominator, and the anſwer required.

EXAMPLES.

From $\frac{17}{21}$ take $\frac{9}{14}$.

42 com. denom.

21 $2 \times 17 = 34$
14 $3 \times 9 = 27$

Rem. $\frac{7}{42} = \frac{1}{6}$, the anſwer.

From	$\frac{5}{8}$	$\frac{11}{12}$	$\frac{5}{6}$	$\frac{8}{15}$	$\frac{203}{216}$
Take	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{9}{20}$	$\frac{7}{144}$
Rem.	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{30}$	$\frac{1}{12}$	$\frac{397}{432}$

In order to diſtinguiſh the greater of two fractions, let them be reduced to a common denominator, as in caſe V. in Reduction, and that fraction whoſe numerator is greater is the greater fraction; the difference between the new numerators being ſet over the common denominator, will ſhew the exceſs or inequality.

EXAMPLE.

Which of the two is the greater fraction, $\frac{11}{12}$ or $\frac{14}{16}$?

48 com. denom.

12 $4 \times 11 = 44$
16 $3 \times 15 = 45$

Anſ. $\frac{15}{16}$ is greater by $\frac{1}{48}$.

IV. *To ſubtract a fraction or mixt number from a mixt number, when the fractional part to be ſubtracted is greater than that from which it is to be ſubtracted.*

RULE. Find a common denominator and a new numerator, as in the laſt caſe, and then ſubtract the numerator of the greater fraction from the common denominator, and to the remainder add the leſs numerator, and ſet the ſum of both for a new numerator over the common denominator, and carry one to the integral part, and proceed as in whole numbers.

EXAMPLES.

27 common denominator

From $13\frac{1}{9}$ | $3 \times 1 = 3$
Take $8\frac{14}{27}$ | $1 \times 14 = 14$

$4\frac{16}{27}$ $\frac{16}{27}$

From	$6\frac{1}{7}$	$10\frac{3}{10}$	$12\frac{5}{12}$	$19\frac{3}{17}$
Take	$0\frac{6}{7}$	$1\frac{7}{12}$	$6\frac{1}{2}$	$0\frac{7}{15}$
Rem.	$5\frac{6}{7}$	$8\frac{41}{60}$	$5\frac{11}{12}$	$18\frac{16}{15}\frac{3}{5}$

V. *When the fractions are of different denominations.*

RULE. Reduce them to their proper quantities, and ſubtract as before.

EXAMPLES.

1. From $\frac{7}{9}$ of a £. take $\frac{3}{12}$ of a ſhilling.

	s.	d.	15 common denom.
$\frac{7}{9}$ of a £. =	15	$6\frac{2}{3}$	10
$\frac{3}{12}$ of a S. =	0	$3\frac{3}{5}$	9
Rem.	15	$3\frac{1}{15}$	

2. From $\frac{1}{4}$ of a £. take $\frac{1}{5}$ of a ſhilling. Anſ. 14s. 8d.
3. From $\frac{1}{4}$ of a lb. troy take $\frac{1}{6}$ of an ounce. Anſ. 8 oz. 16 dwt. 16 grs.
4. From 7 weeks take $9\frac{7}{10}$ days. Anſ. 5w. 4d. 7h. 12m.
5. From $\frac{1}{6}$ of a yard take $\frac{2}{3}$ of an inch. Anſ. 5 inch. 1 bc.

MULTIPLICATION OF VULGAR FRACTIONS.

RULE. Reduce compound fractions to ſimple ones, and mixt numbers to improper fractions; then multiply the numerators together for a new numerator, and the denominators for a new denominator.

EXAMPLES.

1. Multiply $4\frac{1}{2}$ by $\frac{1}{8}$.

$$\frac{4\frac{1}{2}}{2}$$

$$\frac{9\times1}{2\times8} = \frac{9}{16}, \text{ the anſwer.}$$

2. Multiply $\frac{3}{8}$ by $\frac{4}{5}$. Anſ. $\frac{3}{10}$.
3. Multiply $\frac{7}{9}$ by $\frac{2}{3}$. Anſ. $\frac{14}{27}$.
4. Multiply $48\frac{3}{5}$ by $13\frac{5}{6}$. Anſ. $672\frac{3}{10}$.
5. Multiply $\frac{1}{4}$ of 9 by $\frac{7}{8}$. Anſ. $5\frac{23}{32}$.
6. Multiply $\frac{9}{10}$ by $\frac{3}{5}$ of $\frac{1}{4}$ of $\frac{5}{6}$. Anſ. $\frac{3}{80}$.

DIVISION OF VULGAR FRACTIONS.

RULE. Prepare the fractions, if neceſſary; then invert the diviſor, and proceed as in multiplication.

EXAMPLES.

1. Divide $\frac{4}{7}$ by $\frac{3}{2}$.

$$\frac{4\times 3}{7\times 2} = \frac{12}{14} = \frac{6}{7} \text{ the anſwer.}$$

2. Divide $3\frac{1}{6}$ by $9\frac{1}{2}$.

$3\frac{1}{6}$ $\quad$ $9\frac{1}{2}$

6 $\quad$ 2

$\frac{19}{6}$ $\quad$ $\frac{19}{2}$ Then $\frac{19\times 2}{6\times 19} = \frac{38}{114} = \frac{1}{3}$ the anſwer.

3. Divide 5 by $\frac{7}{10}$. Anſ. $7\frac{1}{7}$.

4. Divide $\frac{9}{10}$ by $4\frac{1}{2}$. Anſ. $\frac{1}{5}$.

5. Divide $9\frac{1}{8}$ by $\frac{1}{2}$ of 7. Anſ. $2\frac{13}{14}$.

6. Divide $5205\frac{1}{5}$ by $\frac{4}{5}$ of 91. Anſ. $71\frac{1}{2}$.

MISCELLANEOUS QUESTIONS

IN THE PRECEDING RULES.

1. What part is $28\frac{1}{12}$ of $33\frac{1}{11}$? Anſ. $\frac{7}{8}$

2. What will remain if $13\frac{1}{8}s.$ and $7\frac{1}{3}d.$ be taken from £.1? Anſ. $5s.\ 6\frac{1}{8}d.$

3. Which is the greater fraction $\frac{8}{15}$ or $\frac{9}{20}$? Anſ. $\frac{8}{15}$ is greater by $\frac{1}{12}$.

4. Of what number is 176 the $\frac{11}{13}$ part? Anſ. 368

5. By how much muſt you multiply $13\frac{3}{3}$ that the product may be $49\frac{1}{5}$? Anſ. $3\frac{3}{5}$

6. Find two numbers ſo that $\frac{12}{13}$ of the one will be as much as $\frac{7}{16}$ of the other. Anſ. 126 and 208, or 63 and 104, &c.

7. What is greater, $\frac{1}{5}$ of 6*s.* or 1*s.* $2\frac{1}{2}d.$? Anſ. 1*s.* $2\frac{1}{2}d.$ is greater by $\frac{1}{20}d.$

8. A has $\frac{2}{3}$ of $\frac{3}{4}$ of a ſhip, and B $\frac{3}{8}$ of $\frac{4}{5}$ which is the greater ſhare, and by how much? Anſ. A's ſhare is greater by $\frac{1}{5}$.

9. A farmer being aſked, how many ſheep he had, anſwered, that he had them in 5 fields; in the firſt he had $\frac{1}{4}$ of his flock, in the ſecond $\frac{1}{6}$, in the third $\frac{1}{8}$, in the fourth $\frac{1}{12}$, and in the fifth 450; how many had he? Anſ. 1200.

RULE OF THREE DIRECT IN VULGAR FRACTIONS.

RULE. Having ſtated the queſtion, make the neceſſary preparations, as in Reduction of Fractions, and invert the firſt term; then proceed as in multiplication of fractions.

EXAMPLES.

1. If $\frac{1}{4}$ of a yard of cloth coſt $\frac{2}{3}$ of a ſhilling, what will $\frac{7}{8}$ of a yard come to?

$$\begin{array}{lccc} & yd. & & yd. \\ \text{If } & \frac{1}{4} & : \quad \frac{2}{3} \quad :: & \frac{7}{8} \\ \textit{inverted} & & s. & \end{array}$$

$$\frac{4\times 2\times 7}{1\times 3\times 8} = \frac{56}{24} = 2s.\ 4d. \text{ the anſwer.}$$

2. If $\frac{3}{16}$ of a ſhip coſt £.273 2*s.* 6*d.* what is $\frac{5}{7}$ of her worth? Anſ. £.227 12*s.* 1*d.*

3. If $\frac{1}{4}$ of a yard coſt $\frac{3}{5}$ of a pound, what will $\frac{2}{5}$ of an ell Engliſh come to, at the ſame rate? Anſ. £.2 0 0

4. A perſon, having $\frac{3}{5}$ of a coal mine, ſells $\frac{1}{4}$ of his ſhare for £.171; what is the whole mine valued at? Anſ. £.380.

SINGLE RULE OF THREE INVERSE, IN VULGAR FRACTIONS.

EXAMPLES.

1. If $25\frac{2}{7}s.$ will pay for the carriage of an cwt. $145\frac{1}{4}$ miles, how far may $6\frac{1}{2}$ cwt. be carried for the ſame money? Anſ. $22\frac{9}{25}$.

2. If $3\frac{1}{4}$ yds. of cloth that is $1\frac{1}{3}$ yard wide, be ſufficient to make a cloak, how much muſt I have of that ſort, which is $\frac{4}{5}$ yard wide, to make another of the ſame bigneſs? Anſ. $4\frac{7}{8}$ yds.

3. If 3 men can do a piece of work in $4\frac{1}{2}$ hours, in how many hours will ten men do the ſame work? Anſ. $1\frac{7}{20}$.

4. If the penny white-loaf weigh 7 oz. when a buſhel of wheat coſt 5*s.* 6*d.* what is the buſhel worth when the penny white-loaf weighs but $2\frac{1}{2}$ oz.? Anſ. 15*s.* $4\frac{4}{5}d.$

PRACTICE

Is a contraction of the Rule of Three direct, when the firſt term happens to be an unit, or one, and has its name from its frequent uſe in buſineſs.

The TABLE.

Parts of a £.

£.	d.		
10		is	½
6	8	—	⅓
5		—	¼
4		—	⅕
3	4	—	⅙
2	6	—	⅛
2		—	1/10
1	8	—	1/12
1		—	1/20

Parts of a ſhilling.

d.		
6	is	½
4	—	⅓
3	—	¼
2	—	1/6
1½	—	⅛
1	—	1/12

Parts of a Ton.

Cwt.	Qr.		
10		is	½
5		—	¼
4		—	⅕
2	2	—	⅛
1		—	1/20

Parts of a Cwt.

Qrs.	lb.		
2		is	½
1		—	¼
	16	—	1/7
	14	—	⅛
	8	—	1/14
	7	—	1/16
	4	—	1/28
	2	—	1/56

Parts of ½ Cwt.

lb.		
28	is	½
14	—	¼
8	—	1/7
7	—	⅛
4	—	1/14
3½	—	1/16
2	—	1/28

Parts of ¼ Cwt.

lb.		
14	is	½
7	—	¼
4	—	1/7
3½	—	⅛
2	—	1/14
1	—	1/28

CASE I.

When the price is an aliquot, or even part of a ſhilling.

RULE. Divide the given number by the part, and the quotient is the anſwer in ſhillings; what remains is to be reduced as in Compound Diviſion.

EXAMPLES.

1. What will 4596 yards coſt at 6d. per yard?

6d. ½ | 4596

2|0 | 229|8

114 18 Anſ. £114 18s.

	Yards.		d.		£.	s.	d.
2.	3746	at	4 per yard	Anſ.	62	8	8
3.	1095		3 - - -		13	13	9
4.	7596		2 - - -		63	6	
5.	3747		1 - - -		15	12	3
6.	3203		1½ - - -		20	0	4½

Case II.

When the price is pence, or pence and farthings, and no even part of a ſhilling.

Rule. Find the even parts for the price, and proceed as in Caſe I. and the ſum of the quotients is the anſwer.

Examples.

1. What will 4937 yards come to, at 9d. per yard ?.

6	½	4937
3	½	2468 6
		1234 3
2\|0		3702 9

Anſ. £.185 2 9

	Yards.		d.		£.	s.	d.
2.	2765	at	8 per yard	Anſ.	92	3	4
3.	3762		7 - -		109	14	6
4.	3159		7½ - -		98	14	4½
5.	1496		11 - - -		68	11	4
6.	1895		10½ - -		82	18	1½
7.	4689½		5 - - -		97	13	11½
8.	3689		8¼ - -		126	16	2¼
9.	1871		2½ - -		19	9	9½
10.	8914		8¼ -		306	8	4½
11.	2563½		9½ -		101	9	5¼
12.	95¼		10½ -		4	3	9½
13.	201¼		9 -		7	10	11¼

Case III.

When the price is ſhillings, or ſhillings and pence, and an even part of a pound.

Rule. Divide the given quantity by the even part, and the quotient is the anſwer in pounds. If there be a remainder, reduce it as in Compound Diviſion.

EXAMPLES.

2 At 6s. 8d. per yard, what will 473 yards come to?

6s. 8d. | ⅓ | 473

Anſ. £.157 13s. 4d.

	yards.		s. d.	£. s. d.
2.	387	at	10	Anſ. 193 10
3.	478	-	5	119 10
4.	397	-	3 4	66 3 4
5.	797½	-	2 6	99 13 9
6.	159¼	-	1 8	13 5 5

CASE IV.

When the price is ſhillings, or ſhillings and pence, which make no even part of a pound.

RULE. Find the even parts for the price, and divide as in Caſe III, or multiply the given quantity by the ſhillings, and take the even parts of ſhillings for the pence, as in Caſe II.

EXAMPLES.

1. What coſt 287 yards at 17s. 6d. per yard.

First method.

287

s.	d.		
10		½	143 10
5		¼	71 15
2	6	⅛	35 17 6

Anſ. £.251 2 6

Second method.

287
17 6

2009
287

6 | ½ | 143 6

2|0)502|2 6

Anſ. £.251 2 6

	yards.		s. d.	£. s. d.
2.	8172	at	15	Anſ. 6129
3.	3691	-	19	3506 9
4.	4765	-	11 8	2779 11 8
5.	3718	-	18 4	3408 8 4
6.	709¼	-	12 6	443 5 7½
7.	213	-	14 10	157 19 6
8.	96½	-	2 9½	13 9 4¼
9.	158	-	5 8¼	45 5 2½
10.	4705¼	-	3 9	882 6 6¾
11.	127	-	7 5¼	47 9 10¼

Case V.

When the price is an even number of ſhillings.

Rule. Multiply the quantity by half the ſhillings, doubling the firſt (or right hand) figure of the product for ſhillings, the reſt are pounds.

Examples.

1. What will 788 yards come to, at 2 ſhillings per yard?

788
1=half the ſhillings.

Anſ. £.78 16

	yards.		s.		£.	s.
2.	347	at	4	Anſ.	69	8
3.	638	-	6	-	191	8
4.	589¼	-	8	-	235	14
5.	246	-	10	-	123	0
6.	324¼	-	12	-	194	17
7.	523	-	14	-	366	2
8.	745	-	16	-	596	0
9.	373½	-	18	-	336	3
10.	270	-	20	-	270	0
11.	172½	-	22	-	189	15
12.	89¼	-	24	-	107	2

Case VI.

When the price is pounds, ſhillings, &c.

Rule. Multiply the integers of the given quantity by the pounds, and work for the ſhillings, &c. by ſuch of the preceding rules as you think beſt, and work likewiſe for the fractional parts of the integer; the ſum of theſe will give the anſwer.

Examples.

1. What will 173 cwt. 1 qr. 14 lb. of ſugar come to, at £.3 15s. 6d. per cwt.?

173 1 14
3 15 6

s.	d.					
			519			
10		½	86	10		
5		½	43	5		
	6	1/10	4	6	6	
1 qr.		¼	0	18	10½	
14 lb.		½	0	9	5¼	

Anſ. £.654 9 9¾

	cwt. qrs. lb.		£. s. d.		£. s. d.
2.	119 1 19	at	6 13 11	Anſ.	787 12 4½
3.	310 3 22		23 8		6 2 - 2¾

In working queſtions of this kind, when the quantity is not above the multiplication table, the following method is uſed.

1. What will 45 cwt. 2 qrs. 14 lb. of ſugar come to, at £.1 : 9 per cwt. ?

	3	7	9
			5
	16	18	9
			9
	152	8	9 price of 45 cwt.
2 qrs. ½	1	13	10½ price of 2 qrs.
14 lb. ¼	0	8	5¼ price of 14 lb.
Anſ.	£.154	11	1

	Tons.	cwt.	qrs.	lb.		£.	s.	d.		£.	s.	d.
2.		57	2	8	at	3	17	9	Anſ.	223	16	2
3.		19	3	13		2	5	10		45	10	6
4.		75	3	25			48	5		183	18	4¼
5.		2	1	18			59	8		7	3	10
6.		1	1	11			63	9		4	5	11¼
7.		0	3	19			54	0		2	9	7¼
8.	37	14	2	14	hemp	89	6	8	per ton	3370	13	2
9.	27	16	3	18		90	10			2520	0	5
10.		15	2			92	5			71	9	10¼
11.	17	10	2			91	10			1603	10	9

1. What will 37 cwt. 3 qrs. 7 lb. of ſugar come to, at 14 dols. 40 cts. per cwt. ?

		14,40
		37
		10080
		4320
2 qr. ½		720
1 qr. ¼		360
7 lb. ¼		90
		544,50 Anſ. 544 dols. 50 cts.

	Tons.	cwt.	qrs.	lb.		dols.	cts.			dols.	cts.
2.	24	18	3	18	of hemp at	289	50	per ton	Anſ.	7221	75
3.	31	16				268	75			8546	25
4.	19	14	2	12	iron	110				2170	38 8
5.		17	3	24	cordage	14		per cwt.		251	50

	A.	R.	per.		dols.	cts.			dols.	cts.
6.	25	2	25	of land	at 29		per acre	Anſ.	744	$\frac{1}{2}$
7.	87	1	37		33				2886	88
8.	229	3	18		18	50			4252	45$\frac{1}{2}$
9.		3	26		25				22	81

1. How much will 49 M. 3 hund. 25 caſts of ſtaves come to, at 17 dols. per M.

49
17

343
49

2 hund.	$\frac{1}{2}$	3,4
1	$\frac{1}{4}$	1,7
20 caſts	$\frac{1}{2}$	,85
5	$\frac{1}{4}$	,212

839,162 Anſ. 839 dols. 16 cts. 2m.

	M.	hund.	caſts			dols.		dols.	cts.
2.	19	8	15	W. O. hhd.	ſtaves	31	per M. Anſ.	614	96
3.	22	9	37	R. O. do.	do.	13		298	90
4.	28	1	8	W. O. barrel	do.	16		449	92
5.	4	2	11			15		63	41

1. What will 8,767 feet of merchantable boards come to, at 38s. 6d. per M.?

8,767
38 6

70136
26301

6d.	$\frac{1}{2}$	4383

20)337,529 ſhillings

Anſ. £.16.17 6

The fourth figure of the product of the remainder multiplied by 12, is ſet down for pence.

				s.	d.		£.	s.	d.
2.	18,370	feet merch.	boards	39	8	per M. Anſ.	36	8	8
3.	2,819	do. do.	do.	37	4		5	5	8
4.	,327	do. do.	do.	41			0	13	5
	,92	do. refuſe	do.	20	6		0	3	9

What it the amount of a ſeaman's wages from the 15th of March to the 6th of December following, being 8 months and 20 days, at 16 dollars per month?

16
8

128 for 8 months

15 days $\frac{1}{2}$ month 8

5 $\frac{1}{3}$ 2.66$\frac{2}{3}$

138,66$\frac{2}{3}$ Anſ. 138 dols. 66$\frac{2}{3}$ cts.

NOTE. In calculating the time of ſeaman's ſervice, either of the days of engaging and being diſcharged is taken, but not both.

What is the amount of a ſeaman's wages from 15th of June to the 28th of May following, at 15 dols. per month?

Anſ. 171 dols.

At £.4 11 3 per cwt. what will 3 qrs. 25$\frac{1}{2}$ lb. come to?

		4	11	3
2 qrs.	$\frac{1}{2}$	2	5	7$\frac{1}{2}$
	$\frac{1}{2}$	1	2	9$\frac{1}{4}$
14 lb.	$\frac{1}{2}$	0	11	4$\frac{7}{8}$
7	$\frac{1}{4}$	0	5	8$\frac{7}{16}$
3$\frac{1}{2}$	$\frac{1}{2}$	0	2	10$\frac{7}{32}$
1	$\frac{1}{7}$	0	0	9$\frac{3}{112}$
Anſ.		£.4	9	2$\frac{12}{224}$.

What will 19 tons, 19 cwt. 3 qrs. 27$\frac{1}{2}$ lb. come to at £.19 19s. 11$\frac{3}{4}$d. per ton? Anſ. £.399 19s. 5$\frac{1664}{17920}$.

TARE AND TRET.

TARE and TRET are allowances made in ſelling goods by weight.

Tare is an allowance made to the buyer for the weight of the hogſhead, barrel, or bag, containing the commodity.

Tret is an allowance for waſte, duſt, &c. generally at 4 lb. per 104 lb.

Gloſſ is an allowance for the turn of the ſcale, at 2 lb. per 3 cwt.

Groſs weight is the whole weight of the goods, together with the hogſhead, barrel, or bag, &c. that contains them.

Suttle is when part of the allowance is deducted from the groſs.

Neat weight is what remains after all allowances are made.

Cuſtom-Houſe Allowances on Tea, Coffee, and Sugar.

	lb.
Tare on whole cheſts of bohea tea -	70
—— on every half cheſt do.	36
—— on quarter do.	20
—— on every cheſt of hyſon or other green teas, the groſs weight of which 70 lb. or upwards	20
—— on every box of other tea, not leſs than 50 lb. or more than 70 lb. groſs	18
If 80 lb. groſs -	20
And from 80 lb. groſs and upwards -	22

Which tares ſhall include rope, canvaſs and other coverings.

Tares for all other boxes of tea according to invoice, or actual weight thereof.

Tare for coffee in bags	2	per 100
—— in bales	3	do.
—— in caſks	12	do.
On ſugar, other than loaf in caſks,	12	do.
—— in boxes	15	do.
—— in bags or mats	5	do.

There is an allowance of two per cent. for leakage on the quantity which ſhall appear to be contained in any caſk of liquor ſubject to duty by the gallon; and ten per cent. on all beer, ale, and porter in bottles, and 5 per cent. on all other liquors in bottles in lieu of breakage, or the duties may be computed on the actual quantity, at the option of the importer, to be made at the *time of entry*.

Examples.

1. Sold ten caſks of allum, weighing groſs 33 cwt. 2 qrs. 15 lb. tare 15 lb. per caſk; what is the amount at 23*s.* 4*d*, per cwt.?

	cwt.	*qr.*	*lb.*	
groſs	33	2	15	10 caſks.
tare	1	1	10	15 lb. per caſk.
neat	32	1	5	112)150

C. 1 1 10 tare.

Anſ. £.37 13 6½

2. At 1 dol. 25 cts. per lb. what will 3 cheſts of hyſon tea come to, weighing groſs 96 lb. 97 lb. and 101 lb.; tare 20 lb. per cheſt.

Anſ. 292 dols. 50 cts.

3. At 9 dols. 49 cts. per cwt. what will 3 hhds. of tobacco come to, weighing groſs, viz.

	cwt.	*qrs.*	*lb.*	*lb.*
No. 1.	9	3	25	tare 149
2.	10	2	12	150
3	11	1	25	158

Anſ. 262 dols. 94½ cts.

4. At 79*s*. 9*d*. per cwt. how much will 4 hhds. of madder come to, weighing groſs, viz.

	cwt.	*qrs.*	*lb.*	
No. 1.	10	3	4	
2.	11	2	13	
3.	10	1	16	
4.	14	3	19	tare 14 lb. percwt.
14 lb. $\frac{1}{8}$	47	2	24	groſs
	5	3	24	tare
	41	3	0	neat

Anſ. £.166 9 6$\frac{1}{4}$

5. At 62*s*. per cwt. what will a hhd. of ſugar come to, weighing groſs 7 cwt. 1 qr.; tare 12 lb. per cwt.? Anſ. £.20 1 4

6. At 21 cts. per lb. what will 6 hhds. of coffee come to, weighing groſs, viz.

	cwt.	*qr.*	*lb.*	*lb.*
No. 1.	7	1	14	tare 96
2.	8	2	21	98
3.	7	1	21	91
4.	6	3	25	90
5.	7	0	23	89
6.	8	1	12	100

Anſ. 964 dols. 32 cts.

7. What would the above coffee amount to, allowing 12 lb. per cwt. as tare on the groſs weight? Anſ. 966 dols. 84 cts.

8. At 72*s*. 6*d*. per cwt. how much will 8 hhds. of ſugar come to, weighing groſs each 8 cwt. 3 qrs. 7 lb.; tare 12 lb. per cwt.?

Anſ. £.228 3 7$\frac{1}{4}$

9. At 23 cents per lb. what will 4 bags of coffee come to, weighing groſs 450 lb.; tare 2 per cent. or 2 lb. per 100 lb.?

Anſ. 110 dols. 43 cts.

10. At 12 dols. 50 cents per cwt. what will 3 barrels of ſugar come to, weighing groſs, viz.

	cwt.	*qrs.*	*lb.*	
No. 1	2	2	10	
2	2	1	21	
3	2	0	15	Tare 21lb. per barrel.

Anſ. 82 dols. 47 cts. 7 ms.

11. At 15 dols. 40 cts. per cwt. what will 4 hhds. of ſugar come to, weighing groſs, viz.

	cwt.	*qrs.*	*lb.*	
No. 1	7	3	13	
2	8	1	10	
3	7	2	12	
4	8	1	21	Tare 12lb. per cwt.

Anſ. 443 dols. 43 cts. 7 ms.

12. A has in his poſſeſſion a hhd. of ſugar, weighing groſs 9 cwt. 3 qrs. owned equally between him and B. It is required to know how much ſugar he ſhould weigh out to B, allowing tare 12lb. per cwt. ? Anſ. 4 cwt. 1 qr. 11½ lb.

13. At 19½ cents per lb. what will 2 hhds. of Coffee come to, weighing groſs 15 cwt. 3 qrs. 11 lb. allowing Cuſtom-houſe tare or 12 per 100 ?

15 3 11

1500 = fifteen hundred.
180 = 15×12 for exceſs in each cwt.
84 = three quarters.
11

Groſs	1775		1775
Tare	213	Tare	12 per 100.
Neat	1562		213,00
	19½		
	14058		
	1562		
	781		
	30459 cts.		Anſ. 304 dols. 59 cts.

14. B buys of C a hogſhead of coffee, weighing groſs 9 cwt. 2 qrs. tare 12 lb. per cwt. what will it amount to at 23 cts. per lb. ?
Anſ. 218 dols. 50 cts.

15. If Cuſtom-houſe tare, or 12 per 100, were allowed on the above coffee, what would it amount to, and what difference would it make to the buyer ?
Anſ. It amounts to 215 dls. 51 cts. being 2 dls. 99 cts. in his favour.

16. What is the groſs weight of a hogſhead of tobacco, weighing neat 11 cwt. 1 qr. tare 14 lb. per cwt. ?
Anſ. 12 cwt. 3 qrs. 12 lb.

FELLOWSHIP

Is when two or more join their ſtocks and trade together, dividing their gain or loſs, in proportion to each perſon's ſhare in the joint ſtock.

SINGLE FELLOWSHIP.

Single Fellowſhip is when different ſtocks are employed for a certain equal time.

RULE. As the whole ſtock is to the whole gain or loſs, ſo is each man's particular ſtock to his particular ſhare of the gain or loſs.

EXAMPLES.

1. A and B buy certain merchandizes, amounting to £.120, of which A pays £.80 and B £.40, and they gain by them £.32—what part of it belongs to each?

A £.80
B 40

As 120 : 32 :: { 80 / 40 } Anſ. £.21 6 8 A. / 10 13 4 B.

2. A ſhip worth 8400 dollars being loſt at ſea, of which ¼ belonged to A, ½ to B, and the remainder to C, what loſs will each ſuſtain, ſuppoſing they have 6000 dollars inſured?

Anſ. A's loſs 600, B's 800 and C's 1000 dols.

3. A and B have gained 1260 dollars, whereof A is to have 10 per cent. more than B, what is the ſhare of each?

Anſ. A's 660, B's 600 dols.

4. A bankrupt is indebted to A 500 dols. 37 cts. to B 228 dols. to C 1291 dols. 23 cts. to D 709 dols. 40 cts. and his eſtate is worth but 2046 dols. 75 cts. how much does he pay per cent. and what is each creditor to receive?

Anſ. he pays 75 per cent. and A's part is 375 dols. 27¼ cts. B's 171 dols. C's 968 dols. 42¼ cts. and D's 532 dols. 5 cts.

5. Three boys, John, James and William, buy a lottery ticket for 3 dols. of which John pays 90 cts. James 1 dol. and William the remainder. This ticket is entitled to a prize of 2000 dollars, ſubject to a deduction of 12½ per cent. how much is each to receive?

Anſ. John 525 dols. James 583 dols. 33⅓ cts. William 641 dols. 66⅔ cts.

6. Three merchants made a joint ſtock—A put in £.565 6 8, B £.478 5 4 and C a certain ſum, and they gained £.373 9 11, of which C took for his part £.112 11 11—required A and B's part of the gain, and how much C put in?

Anſ. A's gain £.141 6 8, B's £.119 11 4, and C put in £.450 7 8.

7. Three men have to ſhare a legacy of 1500 dols. of which B is to have ⅓, C ¼ and D the remainder, but C relinquiſhes his part to B and D, leaving it to be divided between them, according to their ſhares in the whole. It is required to know how much of the legacy B and D receive reſpectively?

Anſ. B's part is 1000, D's 500 dols.

DOUBLE FELLOWSHIP.

Double Fellowſhip is when the ſtocks are employed for different times.

RULE. Multiply each man's ſtock by its time, and add them together, then ſay, As the ſum of the products is to the whole gain or loſs, ſo is the product of each man's ſtock and time to his ſhare of the gain or loſs.

1. B and C trade in company, B put in £.950 for 5 months, and C £. 785 for 6 months, and by trading they gain £.275 18 4; what is each man's part of the profit?

B's ſtock $950 \times 5 = 4750$
C's $785 \times 6 = 4710$

As 9460 : 275 18 4 :: { 4750 : £.138 10 10 B's
 { 4710 : 137 7 6 C's

2. Two merchants enter into partnerſhip for 16 months, A put into ſtock at firſt 1200 dols. and at the end of 9 months 200 dols. more, B put in at firſt 1300 dols. and at the expiration of 6 months took out 500 dols.—with this ſtock they gained 772 dols. 20 cts.—what is each man's part of it?

Anſ. A's 401 dols. 70 cts.—B's 370 dols. 50 cts.

3. Two perſons hired a coach in Boſton, to go 40 miles, for 20 dols. with liberty to take in 2 more when they pleaſed. Now when they had gone 15 miles, they admit C, who wiſhed to go the ſame route, and on their return, within 25 miles of Boſton, they admit D for the remainder of the journey. Now as each perſon is to pay in proportion to the diſtance he rode, it is required to ſettle the coach-hire between them.

Anſ. A and B 6 dols. 40 cts. each, C 5 dols. 20 cts. & D 2 dols.

SIMPLE INTEREST

Is a compenſation made by the borrower of any ſum of money to the lender, according to a certain rate per cent. agreed on for the principal only.

The legal rate of intereſt in Maſſachuſetts is 6 per cent.

Principal, is the money lent.
Rate, is the ſum per cent. agreed on.
Amount, is the principal and intereſt added together.

GENERAL RULE. Multiply the principal by the rate per cent. and divide the product by 100, and the quotient is the anſwer for one year.

EXAMPLES.

1. What is the intereſt of £.496 for one year at 6 per cent.?

496
6
29|76
20
15|20
12
2|40
4
1|60

Anſ. £.29 15 2½.

2. What is the intereſt of £.383 15 9 for 2 years at 8½ per cent.?

383 15 9
8½
3070 6 0
191 17 10½
32|62 3 10½
20
12|43
12
5|26
4
1|06

£.32 12 5¼ for one year.
2
Anſ. £.65 4 10½ for two years.

3. What will £.826 13 9 amount to in 1 year, at 5 per cent.?

5=1/20)826 13 9 principal
41 6 8¾ intereſt

Anſ. £.868 0 5¾ amount

4. What is the intereſt of £.103 11 4, for 4 years, at 7½ per per cent. per annum? Anſ. £.31 1 4½

5. What will £.36 1 9 amount to, in 3 years, at 5 per cent. per annum? Anſ. £.42 4 11¼

6. What is the amount of £.19 15 8, for 5 years, at 6¼ per cent. per annum? Anſ. £.26 9 1¼

7. How much is the intereſt of £.72 12 6 for ſix months, at 6 per cent. per annum?

72	12	6
		6
4\|35	15	0
20		
7\|15		
12		
1\|80		
4		
3\|20		

6 m. $\frac{1}{2}$)4 7 $1\frac{3}{4}$ for 2 years

Anſ. £.2 3 $6\frac{1}{4}$ for 6 months.

NOTE. When the time is months, multiplying by the rate for the time, gives the anſwer. This rate is found by multiplying the time by the given rate per cent. for a year, and dividing the product by 12. The quotient is the rate required, and is always equal to half the months when the yearly rate is 6 per cent.

8. What is the intereſt of £.25 19 3 for 8 months, at 6 per cent. per annum?

8 months
6
12)48
4 rate = half the months.

£.25 19 3
4
1,03 17 0
20
0,77
12
9,24 Anſ. £.1 0 9

9. How much will £.53 9 4 amount to, in 20 months, at 6 per cent. per annum? Anſ. £.58 16 3

10. How much is the intereſt of a bond of £.295 17 10 for 18 months, at 8 per cent. per annum?

18
8
12)144
12

295 17 10
12 the rate for the time.
35,50 14 0
20
10,14
12
1,68
4
2,72 Anſ. £.35 10 $1\frac{1}{2}$

11. How much is the intereſt of £.80 12 9, for 23 months, at 6 per cent. per annum? Anſ. £.9 5 5¼

12. How much is the intereſt of £.36 14 9 from 19th May to 25th October, at 6 per cent?

36	14	9				
		6				
2,20	8	6	4 m.=⅓	2	4	1 for 1 year.
				0	14	8¼
4,08			1 m.=¼	0	3	8
		12	6 d.=⅕	0	0	8¼
1,02			Anſ. £.0	19	1	

13. What will £.187 14 9 amount to, from 11th June, 1797, to 26th October, 1798, at 6 per cent. per annum? Anſ. £.203 4 5⅝

14. How much is the intereſt of £.19 13 7 from 3d January, 1797, to 18th May, 1798, at 6 per cent. per annum?
Anſ. £.1 12 5¼.

To find the intereſt of any ſum for months, at 6 per cent. per annum, by contraction.

RULE. Multiply the pounds by the number of months; the firſt or units figure of the product is pence, and the reſt are ſhillings, obſerving to increaſe the pence in the product by 1 when they exceed 4.

EXAMPLES.

15. What is the intereſt of 56*l.* for 1, 5, 7, and 12 months?

	56	56	56	56
mo.	1	5	7	12
Anſ.	5*s.* 7*d.*	28*s.* 0*d.*	39*s.* 2*d.*	67*s.* 2*d.*

16.	£.45	for	6 Months.	Anſ. £.1	7	0
17.	324		5	8	2	0
18.	19		7	0	18	3
19.	11		1	0	1	1

If there are Shillings, &c.

To the pounds add the decimal of the neareſt even number of ſhillings, (this will be ſufficiently exact for buſineſs) and multiply by the months as before, ſeparate two figures of the product to the right,

and the left hand figures are the ſhillings, then multiply the figures pointed off, by 12, and the product, rejecting two figures to the right, is the pence of the anſwer.

2	4	6	8	12	14	16	18 ſhillings.
,1	,2	,3	,4	,6	,7	,8	,9 decimals.

20. How much is the intereſt of £.347 5 9 for 3 months?

347·3
3
ſhillings, 104,19
Anſ. £.5 4 2

21. How much is the intereſt of £.195 15 10½ for 10 months?

195,8
10
ſhillings, 195,80
Anſ. £.9 15 9½

,80
12
9,60
4
2,40

The value of the remainder is thus ſhewn to be 9½*d*.

22. What is the intereſt of £.590 19 9¾ for 3 years, 7 months and 19 days?

£.591 nearly.
43
1773
2364
15 days ½ 295
3 ¼ 59
1 ⅓ 19
2578,6+1 becauſe it exceeds 4—ſee the (Rule.
£.128 18 7

23. How much is the intereſt of £.476 9 8 for 9 months and 13 days?

476,5
9
4288,5
10 days ⅓ 158,8
3 do. 1/12 47,6
449·49
Anſ. £.22 9 5¼

24. What is the intereſt of £. 40, for 7 years 5 months and 26 days?

	40
	89 months
	3560
15 days ½	20
10 do. ⅓	13
1 do. 1/10	1
	3594

Anſ. £.17 19 5

25. What is the intereſt of £.240, for 50 days, at 6 per cent?

240	
6	
1440	
20	
8,00	

d. d.
365 : 14l. 8s. :: 50 : 1l. 19s. 5¼d.

Or by Compound Proportion.

240
50
6083)12000(1
6083
5917
20
6083)118340(19
6083
57510
54747
2763
12
6083)33156(5
30415
2741
4
6083)10964(¼
6083
4881

Anſ. £.1 19 5¼

26. What is the intereſt of £.154 7 5, for 1 day, at 6 per cent?

	154,4
	1
⅓ of 100	1,54.4

Anſ. 5¼d. or 6d. nearly.

SIMPLE INTEREST IN FEDERAL MONEY.

The principal given in Engliſh money, and the intereſt required in federal.

RULE. Reduce the given ſum to ſhillings, the product gives the anſwer in cents, and the pence are mills nearly; the reaſon is, that at 6 per cent. per annum, one fifth of a dollar is the annual intereſt of a pound; that is, 20 cents for 20 ſhillings, or 1 cent for every ſhilling in any given ſum.

EXAMPLES.

1. Required the intereſt of £.194 15 3 for 1 year in federal money.

194 15 3
20

3895 cents. Anſ. 38 dols. 95 cts. 3 mills.

2. What is the intereſt of £.129 13 2 for 2 years in federal money?

129 13 2
20

2593.2 for one year.
2

5186,4 Anſ. 51 dols. 86 cts. 4 m.

3. What is the intereſt of £.91 12 1 for 5 years in federal money?

91 12 1
20

1832,1 for 1 year.
5

91,605 for 5 years. Anſ. 91 dols. 60½ cts.

4. What is the intereſt of £.139 17 2 for 4 months?

139 17 2
20

4m. ⅓ 2797,2

9:32:4 Anſ. 9 dols. 32 cts. 4ms.

Principal in federal money, and intereſt required in the ſame.

RULE. Multiply the principal by the rate per cent. and as you *ſuppoſe* 100 for a diviſor, point off the quotient as in diviſion of *decimals.*

The following rule anſwers the ſame purpoſe.

When the principal is dollars only, multiply by the rate, and from the product point off two figures to the right, the figures to the left hand of the point give the anſwer in dollars, and the reſt are decimal parts or cents.

If there are cents, &c. in the principal, multiply by the rate and point off as above. The figures to the left of the point give the anſwer in the ſame name with the loweſt denomination in the principal.

EXAMPLES.

5. What is the intereſt of 419 dollars for 1 year, at 6 per cent?

419
6

25,14 Anſ. 25 dols. 14 cts.

6. What is the intereſt of 173 dols. 50 cts. for 1 year, at 6 per cent?

173,50
6

Cents 1041,00 Anſ. 10 dols. 41 cts.

7. What is the intereſt of 327 dols. 82 cts. 5 mills, for 1 year, at 8 per cent?

327,82,5
8

mills 26226,00
Anſ. 26 dols. 22 cents 6 mills.

8. How much is the intereſt of 325 dols. for 3 years, at 6 per cent per annum?

325
6

19,50 for 1 year.
3

58,50 for 3 years.

Or thus,

325
18 rate for the time.

2600
325

58,50
Anſ. 58 dols. 50 cts.

When the time is months.

RULE. Multiply by half the number; this, as was before obſerved, is always equal to the rate, for the time, when the annual rate is 6 per cent. per annum.

EXAMPLES.

9. What is the intereſt of 284 dollars, for 8 months, at 6 per cent ?

284
4

11,36 Anſ. 11 dols. 36 cts.

10. How much is the intereſt of 187 dols. 25 cts. for 16 months, at 6 per cent. per annum ?

187,25
8

Cents 1498,00 Anſ. 14 dols. 98 cts.

11. What is the intereſt of 95 dollars, for 2 months, at 6 per cent. per annum ?

95
1

,95 Anſ. 95 cents.

12. How much is the intereſt of 126 dols. 46 cts. for 9 months, at 6 per cent ?

126,46
4½

505 84
63 23

cents 569,07 Anſ. 5 dols. 69 cts.

13. How much is the intereſt of 124 dols. for one month, at 6 per cent. ?

½)124
,62

Or 124
,5
,62,0
Anſ. 62 cents.

14. What is the intereſt of 694 dols. 84 cts. for nine months, at 10 per cent. per annum ?

694,84
10

Cents 6948,40 for a year
6 ½ 3474,2
3 ½ 1737,1
52,11,3

Or 694,84
7½=rate for the time
4863,88
347,42
Cents 52,11,30
Anſ. 52 dols. 11 cts. 3 m.

15. How much is the amount of 985 dollars for 5 years and 8 months, at 6 per cent. per annum?

dols.	
985	
34	half the months.
3940	
2955	
334,90	intereſt.
985,	principal.
1319,90	amount.

Anſ. 1319 dols. 90 cts.

When the time is months and days, and the annual rate 6 per cent. Multiply by half the months and one ſixth of the days, which is equal to the rate, for the given time, and ſeparate one figure to the right for the decimal in the rate and proceed as uſual. Should there be a remainder in taking a ſixth of the days, reduce it to a vulgar fraction; this, and not the decimal, will *always* give the exact rate.

EXAMPLES.

16. What is the intereſt of 194 dols. for 4 months and 12 days, at 6 per cent.?

m.	*m.*	*dols.*	
		194	
12 : 6 : :	4,4	2,2	= to the rate, found by the rule,
	6		or the annexed calculation.
		388	
		388	
12)26,4			
		4,26,8	
	2,2		

Anſ. 4 dols. 26 cts. 8 ms.

17. How much is the intereſt of 263 dols. 48 cts. for 2 months and 21 days, at 6 per cent.?

	dols.cts.	
	263,48	
	1,3½	
	79044	
	26348	
	13174	
cents,	355,69,8	

Anſ. 3 dols. 55 cts. 6 ms.

18. How much is the intereſt of 318 dols. for 10 months and 16 days, at 6 per cent?

318
5,2⅔
636
1590
⅓ 106
⅓ 106
dols. 16,74,8 Anſ. 16 dols. 74 cts. 8 m.

19. What is the intereſt of 418 dols. for 1 year 7 months and 17 days, at 6 per cent?

418
9,7⅚
2926
3762
⅚ or ½ 209
⅙ or ⅓ . 139
} = 348⅓
dols. 40,89,4 Anſ. 40 dols. 89 cts. 4 m.

418
5
6)2090
348⅓

20. How much is the intereſt of 268 dols. 44 cts. for 8 years 5 months and 26 days, at 6 per cent?

268,44
20,9⅓
241596
536880
⅓ 8948
Cts. 5619,34,4 Anſ. 56 dols. 19 cts. 3 m.

21. What is the intereſt of 1 dollar, for 18 days, at 6 per cent?

1
18
,00,3 mills. Anſ. 3 mills.

One figure is ſeparated for the decimal in the multiplicand, and two cyphers are ſupplied and pointed, according to the general rule.

22. What is the intereſt of 910 dols. 50 cts. for 3 years 9 mo. and 26 days, at 7 per cent. per annum ?

	910,50		Or thus, 910,50	
	7		22,9½	
	63,73,50		819450	
	3		182100	
	191,20,5	for 3 yrs.	182100	
6 mo.	½ 31,86,7		3•350	
3 mo.	¼ 15,93,3		·½)208,80,80	0 at 6 per cent.
15 days	⅛ 2,65,5		34,80,1	
10 days	1/9 1,77,0			
1 day	1/15 ,17,7		dols. 243,60,9 at 7 per cent.	
	dols. 243,60,7		Anſ. 243 dols. 60 cts. 8 mills.	

23. How much will 185 dols. 36 cts. amount to, in 2 years 3 months and 11 days, at 7½ per cent. per annum ?
Anſ. 216 dols. 94 cts. 4 mills.

24. What is the intereſt of 57 dols. 78 cts. for 1 year 4 months and 17 days, at 4 per cent. per annum ? Anſ. 3 dols. 19 cts.

25. How much is the amount of 298 dols. 59 cts. from 19th May, 1797, to the 11th of Auguſt, 1798, at 8 per cent. per annum. Anſ. 327 dols. 98 cts. 4 mills.

26. How much is the amount of 296 dollars, from June 14, 1798, to April 29, 1799, at 5¾ per cent. per annum ?
Anſ. 205 dols. 86 cts.

27. What is the intereſt of 658 dols. from January 9 to October 9 following, at ½ per cent. per month ?
Anſ. 29 dols. 61 cts.

In the calculation of intereſt in federal money, thus far, the year is ſuppoſed to be 12 months of 30 days each, making it only 360 days. Moſt perſons uſe this method of computing the time, but as it is 5 days leſs in a year than the true number, ſome merchants calculate by days without any regard to months, as being more accurate.

EXAMPLES.

28. What is the intereſt of 7086 dollars for 39 days, at 6 per cent. per annum?

By compound proportion.

7086
39
63774
21258
dols. cts.
6083)276354(45 43
24332
83034
30415
26190
24382
18580
18249
331 Anſ. 45 dols. 43 cts.

29. What is the intereſt of 87 dols. 56 cts. for 72 days, at 6 per cent. per annum?

87,56
72
17512
61292
cts. m.
6083)6304,32(103 6
6083
22132
18249
38830
36498
2342 Anſ. 1 doll. 3 cts. 6 m.

	dols.	cts.	days.			dols.	cts.	m.
30.	2962	19	for 254	at 6 per ct. per ann.	Ans.	123	68	8
31.	35		256			1	47	2
32.	1788	97	102			29	7	5
33.	455	52	47			5	51	9
34.	215	80	125			4	43	4
35.	517	90	84			7	15	1
36.	73	63	92			1	11	3

The following method of calculating the intereſt upon accounts, when there are partial payments, is ſometimes uſed.

1798.			dols.		days.	Prod. princ. & time
January	2,	Lent	100	on intereſt for	13	1300
	15,	Lent	110			
			210		5	1050
	20,	Received	162			
			48		14	672
Feb.	3,	Lent	95			
			143		7	1001
	10,	Received	90			
			53		6	318
	16,	Lent	186			
			239		10	2390
	26,	Received	70			
			169		3	507
March	1,	Lent	250			
			419		2	838
	3,	Received	270			
			149		10	1490
	13,	Received	143			
20,	Time of adjuſtment		6		7	42
						9608

d. cts.

Then 6083)9608(1,57 intereſt at 6 per cent.
6083. 6, the principal due.

35250 7,57 the amount due March 20th.
30415

48350
42581

5769

By this method intereſt may be calculated on accounts, multiplying each ſum by the days it is at intereſt, and taking the quotient of 36500, divided by the rate per cent. as a fixed diviſor to the ſum of the products. Thus, the rate in the laſt example being 6 per cent, the diviſor is 6083; for 5 per cent. it would be 7300; for 7 per cent, 5214, &c.

If the time is *months*, multiply each ſum by the months it is at intereſt, and take the quotient of 1200, divided by the rate as a diviſor. Thus, for 6 per cent, the diviſor is 200; for 5 per cent, 240; for 8 per cent, 150, &c.—See Compound Proportion.

In computing interest on notes, &c.

It has generally been the cuſtom to find the amount of the principal from the time the intereſt commenced to the time of ſettlement, and likewiſe the amount of each payment, and then deduct the amount of the ſeveral payments from the amount of the principal.

Example.

A, by his note dated April 25th, 1798, promiſes to pay to B 774 dols. 76 cts. on demand, with intereſt to commence 4 months after the date. On this note are the following endorſements:

Received Oct. 12th, 1798, 260 dols. 19 cts.—Oct. 13th, 1798, 60 dols.—Nov. 2, 1798, 200 dols. And the ſettlement is made December 15th, 1798.

Calculation.

			dols.	*cts.*
The principal carrying intereſt from 25th Aug. 1798,			774	76
Intereſt to December 15th, 1798 -	3 m. 20 days,		14	20
Amount of the principal - -	-		788	96
		dols. *cts.*		
Firſt payment, Oct. 12th, 1798 -		260 19		
Intereſt to December 15th, 1798,	2 m. 3ds.	2 73		
Second payment, Oct. 13th, 1798,		60		
Intereſt to Dec. 15th, 1798,	2 2	0 62		
Third payment, Nov. 2, 1798,		200		
Intereſt to Dec. 15, 1798,	1 13	1 43		
Amount of the payments -		-	524	97
Settlement is made for -		Dols.	263	99

The Rule eſtabliſhed by the Courts of Law in Maſſachuſetts for making up judgments on SECURITIES *for* MONEY, *which are upon intereſt, and on which partial payments have been endorſed.*

Compute the intereſt on the principal ſum, from the time when the intereſt commenced to the firſt time when a payment was made, which exceeds either alone or in conjunction with the preceding payments (if any) the intereſt at that time due: add that intereſt to the principal, and from the ſum ſubtract the payment made at that time, together with the preceding payments (if any) and the remainder forms a new principal; on which compute and ſubtract the intereſt, as upon the firſt principal: and proceed in this manner to the time of the judgment. By this Rule, the payments are firſt applied to keep down the intereſt: and no part of the intereſt ever forms a part of a principal carrying intereſt.

The following example will illuſtrate the rule, in which the intereſt is computed at the rate of ſix per cent. by the year, that being the legal rate of intereſt in Maſſachuſetts.

A, by his note dated January 1, 1780, promiſes to pay B 1000 dols. in ſix months from the date with intereſt from the date.

On this note are the following endorſements:

Received April 1, 1780, 24 dols. Aug. 1, 1780, 4 dols. Dec. 1, 1780, 6 dols. Feb. 1, 1781, 60 dols. July 1, 1781, 40 dols. June 1, 1784, 300 dls. Sept. 1, 1784, 12 dls. Jan. 1, 1785, 15 dls. and Oct. 1, 1795, 50 dols. And the judgment is to be entered Dec. 1, 1790.

CALCULATION.

			dols. cts.
The principal ſum carrying intereſt from January 1, 1780,			1000 00
Intereſt to April 1, 1780, 3 months			15 00
		Amount	1015 00
Paid Apr. 1, 1780, a ſum exceeding the intereſt			24 00
Remainder for a new principal			991 00
Intereſt on 991 dols. from April 1, 1780, to Feb. 1, 1781 (10 months)			49 55
		Amount	1040 55
Paid Aug. 1, 1780, a ſum leſs than the intereſt then due	*dols.* 4 00		
Paid Dec. 1, 1780, do. do.	6 00		
Paid Feb. 1, 1781, do. greater than the intereſt then due	60 00		70 00
Remainder for a new principal			970 55
Intereſt on 970 dols. 55 cts. from Feb. 1, 1781, to July 1, 1781 (5 mon.)			24 26
		Amount	994 81
Paid July 1, 1781, a ſum exceeding the intereſt			40 00
Remainder for a new principal			954 81
Intereſt on 954 dols. 81 cts. from July 1, 1781, to June 1, 1784 (2 yrs. 11 m.)			167 09
		Amount	1121 90
Paid June 1, 1784, a ſum exceeding the intereſt			300 00
Remainder for a new principal			821 90
Intereſt on 821 dols. 90 cts. from June 1, 1784, to Oct. 1, 1785, (1 yr. 4 m.)			65 75
		Amount	887 65
Paid Sept. 1, 1784, a ſum leſs than the intereſt then due	*dols.* 12 00		
Paid Jan. 1, 1785, do. do.	15 00		
Paid Oct. 1, '85, do. greater with 2 laſt paymts. than inſt. then due	50 00		77 00
Remainder for a new principal			810 65
Intereſt on 810 dols. 65 cts. from Oct. 1, 1785, to Dec. 1, 1790, the time when judgment is to be entered (5 years 2 months)			251 30
Judgment rendered for the		Amount	1061 95

[illegible]

[illegible] Days in any Month, to the [illegible] Year.

[illegible]											Nov.	Dec.
[illegible]	31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	31
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	92	92
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	90
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	121
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	151
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	182
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	212
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	243
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	274
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	304
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	335
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	365

[illegible]

[illegible] the 9th of [illegible] May for November [illegible] will be [illegible]

[illegible] counting or discounting their [illegible] manner. This from May 9th to [illegible] from Nov. 12th to May 9th [illegible]

[illegible] thus from the [illegible] 9th of Nov. 1809. [illegible] 365=577 days.

[illegible] if the 12th of November be in the leap year, the day will be added to the account.

COMPOUND INTEREST

Is that which arises both from the principal and interest; that is, when the interest or annuity becomes due, and not paid, it is added to the principal, and interest is calculated on this amount as on the principal before.

Rule. Find the simple interest of the given sum for one year, and add it to the principal, and then find the interest for that amount for the next year, and so on for the number of years required. Subtract the principal from the last *amount*, and the remainder will be the compound interest.

EXAMPLES.

1. What is the intereſt of £.246 14 6, for 3 years, at 6 per cent. per annum?

5	$\frac{1}{20}$	246	14	6	
1	$\frac{1}{5}$	12	6	$8\frac{1}{2}$	firſt year's intereſt.
		2	9	4	
5	$\frac{1}{20}$	261	10	$6\frac{1}{2}$	amount of the firſt year.
1	$\frac{1}{5}$	13	1	$6\frac{1}{4}$	ſecond year's intereſt.
		2	12	$3\frac{1}{2}$	
5	$\frac{1}{20}$	277	4	$4\frac{1}{4}$	amount of the ſecond year.
1	$\frac{1}{5}$	13	17	$2\frac{1}{2}$	third year's intereſt.
		2	15	$5\frac{1}{4}$	
		293	17	0	amount of the third year.
		246	14	6	firſt principal.
		47	2	6	compound intereſt for three years.

Anſ. £.47 2s. 6d.

2. What is the compound intereſt of £.760 10s. for 4 years, at 6 per cent. per annum? Anſ. £.199 12 2

3. How much is the amount of £.128 17 6, for ſix years, at 6 per cent. per annum, compound intereſt? Anſ.182 16 $2\frac{3}{4}$

4. How much is the amount of 500 dollars, for three years, at 6 per cent. per annum, compound intereſt?

5	$\frac{1}{20}$	500,	
1	$\frac{1}{5}$	25,	firſt intereſt.
		5,	
5	$\frac{1}{20}$	530,	
1	$\frac{1}{5}$	26,50	ſecond intereſt.
		5,30	
5	$\frac{1}{20}$	561,80	
1	$\frac{1}{5}$	28,09	third intereſt.
		5,61$\frac{1}{4}$	
		595,50$\frac{1}{4}$	the amount required.

Anſ. 595 dols. 50$\frac{1}{4}$ cts.

5. What is the amount of 629 dollars, for 7 years, at 6 per cent. per annum, compound intereſt? Anſ. 945 dols. 78 cts. 3 m.

6. How much is the compound intereſt of 1256 dollars, for 15 years, at 6 per cent. per annum? Anſ. 1754 dols. 6 cts. 6 m.

A TABLE

Shewing the amount of one pound or one dollar for any number of years under 33, at the rates of 5 and 6 per cent. per annum compound intereſt.

YEARS.	5 RATES.	6	YEARS.	5 RATES.	6
1	1,05000	1,06000	17	2,29201	2,69277
2	1,10250	1,12360	18	2,40662	2,85434
3	1,15762	1,19101	19	2,52695	3,02559
4	1,21550	1,26247	20	2,65329	3,20713
5	1,27628	1,33822	21	2,78596	3,39956
6	1,34009	1,41852	22	2,92526	3,60353
7	1,40710	1,50363	23	3,07152	3,81975
8	1,47745	1,59384	24	3,22510	4,04893
9	1,55132	1,68948	25	3,38635	4,29187
10	1,62889	1,79084	26	3,55567	4,54938
11	1,71034	1,89829	27	3,73345	4,82234
12	1,79585	2,01219	28	3,92013	5,11168
13	1,88565	2,13292	29	4,11613	5,41838
14	1,97993	2,26090	30	4,32194	5,74349
15	2,07892	2,39655	31	4,53804	6,08810
16	2,18287	2,54035	32	4,76494	6,45338

The uſe of this Table is plain and eaſy, for multiplying the figures ſtanding againſt the number of years, by the given principal, the product is the amount required.

EXAMPLES.

7. What is the amount of 500 dollars for three years at 6 per cent. compound intereſt?

1,19101	the tabular number for the time.
500	the principal.
595,50500	

Anſ. 595 dols. 50 cts.

8. A merchant, on inſpecting ſome old accounts in March, 1799, finds a ſettlement dated March, 1771, by which it appears there is due from him to A. B. £.2 8s. this ſum he pays with compound intereſt at 6 per cent. per annum. The amount of it is required.

5,11168 the tabular number for 28 years.
2,4 the principal with the ſhillings inſerted decimally.

2044672
1022336

£.12,268032
20

s. 5,360640
12

d. 4,327680
4

qrs. 1,310720 Anſ. £.12 5 4¼ or 40 dols. 89 cts. 3 mills.

Calculated in Federal Money.

5,11168
8 dollars.

dols. 40,89344

Anſ. 40 dols. 89 cts. 3 mills, as above.

COMMISSION AND *BROKERAGE.*

COMMISSION and BROKERAGE are compenſations to Factors and Brokers for their reſpective ſervices.

The method of operation is the ſame as in Simple Intereſt.

EXAMPLES.

1. What is the commiſſion on £.596 18 4 at 6 per cent.?

596 18 4
6

35|81 10 0
20

16|30
12

3|60
4

2|40

Anſ. £.35 16 3½.

Or thus, £.5 | 1/20 | 596 18 4

1 | ¼ | 29 16 11

5 19 4½

£.35 16 3½

2. What is the commiſſion on 1974 dollars at 5 per cent.?

1974
5
98,70 Anſ. 98 dols. 70 cts.

3. What is the commiſſion on £.526 11 5 at 3½ per cent.?
Anſ. £.18 8 7

4. What is the commiſſion on £.1258 17 3 at 7½ per cent.?
Anſ. £.93 3 1¼

5. What is the commiſſion of 2176 dols. 50 cts. at 2½ per cent.?
Anſ. 54 dols. 41 cts. 2 m.

6. The ſales of certain goods amount to 1873 dols. 40 cts. what ſum is to be received for them, allowing 2½ per cent. for commiſſion, and ½ per cent. for prompt payment of the neat proceeds?
Anſ. 1821 dols. 99 cts. 9 m.

7. Required the neat proceeds of certain goods amounting to £.456 11 8 allowing a commiſſion of 2½ per cent.

£.5 1/20 | 456 11 8
2½ ½ | 22 16 7
11 8 3½ commiſſion
Anſ. £.445 3 4½ neat proceeds.

8. What is the commiſſion on £.1371 9 5 at 5 per cent.?
Anſ. £.68 11 5½

9. What is the commiſſion on £.1958 at 5½ per cent.?
Anſ. £.107 13 9½

10. What is the commiſſion on £.1859 7 6 at ⅞ per cent.?
Anſ. £.16 5 4½

11. What is the brokerage on 1853 dols. at ¾ per cent.?
Anſ. 13 dols. 89 cts. 7 m.

12. What is the brokerage on £.874 15 3, at ¼ per cent?
Anſ. £.2 3 8¼

13. What is the brokerage on 1298 dollars 53 cts. at ⅜ per cent?

1298,53
3
8)3895,59
dols. 4,86,94 Anſ. 4 dols. 86 cts. 9 m.

14. What is the brokerage on £.1321 11 4, at 1⅛ per cent?
Anſ. £.14 17 4

15. A factor receives 988 dollars, to lay out, after having deducted his commiſſion of 4 per cent. how much will remain to be laid out?

d.
100
4

d. d.
If 104 : 100 :: 988 : 950 dols. the Anſ.

16. A factor has in his hands 3690 dollars, which he is directed to lay out in iron, reſerving from it his commiſſion of $2\frac{1}{2}$ per cent. on the purchaſe, the iron being 95 dols. per ton; how much did he purchaſe? Anſ. 37 tons 17 cwt. 3 qrs. $16\frac{4}{14}$ lb.

INSURANCE.

INSURANCE is an exemption from hazard, by paying, or otherwiſe ſecuring a certain ſum, on condition of being indemnified for loſs or damage.

Policy is the name given to the inſtrument, by which the contract of indemnity is effected between the inſurer and inſured.

Average loſs is 5 per cent. that is, if the inſured ſuffer any loſs or damage not exceeding 5 per cent. he bears it himſelf, and the inſurers are free.

RULE. The method of operation as in intereſt.

EXAMPLES.

1. What is the premium of inſuring £.924, at 7 per cent? Anſ. £.64 13 7

2. What is the premium on 1650 dols. at 12 per cent? Anſ. 198 dols.

3. What is the premium of inſuring 1250 dollars, at $7\frac{1}{2}$ per cent? Anſ. 93 dols. 75 cts.

4. What is the premium of inſuring 4500 dollars, at 25 per cent? Anſ. 1125 dollars.

5. What is the premium of inſuring 1650 dols. at $15\frac{1}{2}$ per cent? Anſ. 255 dols. 75 cts.

6. What is the premium of inſuring 1873 dols. at $\frac{1}{8}$ per cent? Anſ. 2 dols. 34 cts. 1 m.

7. What ſum is to be received for a policy of 1658 dols. deducting the premium of 23 per cent? Anſ. 1276 dols. 66 cts.

8. What ſum muſt a policy be taken out for to cover 1800 dols. when the premium is 10 per cent. ?

100 Policy.
10 Premium.

90 ſum covered. If 90 : 100 :: 1800 Anſ. 2000 dols.

Proof, 2000 dollars at 10 per cent.
10

200,00

the policy 2000
the premium 200

ſum covered 1800 dols.

9. What ſum muſt a policy be taken out for to cover 3926 dols. 7 cents, when the premium is 6 per cent. ?

Anſ. 4176 dols. 67 cents.

GENERAL AVERAGE.

WHATEVER the maſter of a ſhip in diſtreſs, with the advice of his officers and ſailors, deliberately reſolves to do, for the preſervation of the whole, in cutting away maſts or cables, or in throwing goods overboard to lighten his veſſel, which is what is meant by jettiſon or jetſon, is in all places permitted to be brought into a general average; in which all who are concerned in ſhip, freight and cargo, are to bear an equal or proportionable part of the loſs of what was ſo ſacrificed for the common welfare; and it muſt be made good by the inſurers in ſuch proportions as they have underwritten.

Examples of Adjusted Averages.

1. A loaded ſhip met with ſuch exceeding bad weather, that the maſter and mariners found it impoſſible to ſave her without throwing part of her cargo overboard, which they are authorized to do for preſervation. Being thus neceſſitated, they threw ſuch goods as lay neareſt at hand, and lightened the ſhip of 10 caſks of hardware and 40 pipes of Madeira wine, which they judged ſufficient to keep her from ſinking. Soon after that the ſhip arrived at her deſtined port, and then an average bill was immediately made in order to adjuſt the loſs, and to pay the proprietors of thoſe goods, which were thrown overboard, for the good of the whole.

Average accrued to ſhip —— for goods thrown overboard for preſervation of ſhip, freight and cargo.

	dols.
Ship valued at - - -	12000
Freight (wages and victuals deducted) -	3000
Thomas Nugent's value of goods - -	4000
Thomas Morgan's value of goods - -	2500
James Simpſon's value of goods - - -	8500
Andrew Wilſon for 40 pipes of wine -	4000
Laurence Ward for 10 caſks of hard ware -	6000
	40000

Mr. Andrew Wilſon's goods, thrown overboard, were valued at - - -	4000
Mr. Laurence Ward ditto - -	6000
	10000

If 40000 give 10000 loſs, what loſs will 100 give?
Anſ. 25 per cent.

The ſhip muſt pay to A. W. and L. W. for 12000 dollars, at 25 per cent. - -	3000
The freight, 3000 dollars, at the ſame rate -	750
Thomas Nugent, for 4000 dollars, at the ſame rate -	1000
Thomas Morgan, for 2500 dollars, at the ſame rate -	625
James Simpſon, for 8500 dollars, at the ſame rate -	2125
A. W. and L. W. receive of the owners of the goods ſaved, and the ſhip's owners	7500
Their property being inſured, the underwriters pay them	2500
	10000

2. The Sea-Horſe, Capt. Dix, laden with hemp, cordage, and iron, bound from Riga to Boſton, ran on ſhore, coming through the grounds at Elſineur. The captain hired a great number of men, and ſeveral lighters, to lighten the ſhip, and to get her afloat again, which was done; but he was obliged to pay 409 dols. 23 cts. for their aſſiſtance. This expenſe being incurred to preſerve both ſhip and cargo, the average muſt conſequently be general. When the ſhip arrived at Boſton, the captain immediately made a proteſt and an average bill, which was thus ſtated.

Average accruing to the ſhip Sea-Horſe, from Riga to Boſton, in 1799, for aſſiſtance in getting off the ſtrand of Elſineur.

	dols.	*cts.*
For ſundry charges paid at the Sound for lighters and aſſiſtance in getting off the ſhip	409	23
Proteſt and poſtage	35	37
	444	60

The ſhip's freight money	3460	
Wages for all the people, 4 ms. and 20 d.	560	
Victuals for ditto	300	
	860	
	2600	

The ſhip Sea-Horſe valued at	12000
Freight valued at	2600
William Jenkins for value of hemp	18000
Daniel Jones for value of cordage	4000
Enoch Flinn for value of iron	2400
	39000

If 39000 dollars loſe 444 dols. 60 cts. what will 100 dols. loſe?
Anſ. 1 dol. 14 cts.

	dols.	*cts.*
The ſhip muſt bear 12000 dols. at 114 cents per 100	136	80
The freight 2600 dols. at the ſame rate	29	64
William Jenkins for 18000	205	20
Daniel Jones for 4000	45	60
Enoch Flinn for 2400	27	36
	444	60

BUYING AND *SELLING STOCKS.*

STOCK, in the ſenſe in which it is here uſed, is a fund eſtabliſhed by government or individuals in a corporate capacity, the value of which is variable.

EXAMPLES.

1. What is the amount of 1565 dollars national bank ſtock, at 134 per cent. ?

1565
134
6260
4695
1565
2097,10 Anſ. 2097 dols. 10 cts.

2. What is the amount of 2958 dollars bank ſtock at 25 per cent. advance ?

2958
25 $\frac{1}{4}$ 739,50
3697,50 Anſ. 3697 dols. 50 cts.

	dollars.			*dols. cts.*
3.	6959	of 8 per cent. ſtock, at	110 per cent.	Anſ. 7654,90
4.	1796	6	$91\frac{1}{2}$	1643,34
5.	1284	3	$54\frac{1}{4}$	696,57
6.	3172	deferred	89	2823,08
7.	1518	ſtate notes	$83\frac{1}{4}$	$1271,32\frac{1}{2}$
8.	1686	Union Bank	128	2158,08

DISCOUNT

Is the abating of ſo much money to be received before it is due, as that money, if put at intereſt, would gain in the ſame time and at the ſame rate.

Thus 100 dollars would diſcharge a debt of 106 dollars payable in 12 months, diſcount at 6 per cent. per annum, becauſe the 100 dollars received would, if put to intereſt, regain the 6 dollars diſcount.

RULE. As 100 dollars, with the intereſt for the given time, is to 100, ſo is the given ſum to the preſent worth, and the difference between the preſent worth and the given ſum is the diſcount.

EXAMPLES.

1. What is the preſent worth of 450 dollars due in 6 months, diſcount at 6 per cent. per annum ?

6 *m.* $\frac{1}{2}$ 6

3
100

103 : 100 :: 450 *d.*

Anſ. 436 dollars, 89 cents.

2. How much is the diſcount of £.308 15 due in 18 months, at 8 per cent. per annum ? Anſ. £.33 1 $7\frac{3}{7}$

3. What is the preſent worth of 5150 dollars due in $4\frac{1}{2}$ months, diſcounting at the rate of 8 per cent. per annum, and allowing 1 per cent. for prompt payment ? Anſ. 4950 dols.

4. A is to pay 5927 dols. on the 19th of April, 1799, and 5989 dollars the 19th of July following—It is required to know how much money will diſcharge both ſums on the 19th of January, 1799, diſcounting at 8 per cent. per annum ? Anſ. 11569 dols. 43 cts.

Though the diſcount found by the preceding method is thought to be the ſum that ſhould be deducted for preſent payment in juſtice to both parties, yet in buſineſs the intereſt for the time is taken for the diſcount.

EXAMPLE.

5. What ready money will diſcharge a note of 150 dollars, due in 60 days, allowing legal intereſt or 6 per cent. per annum as diſcount ?

150
1 = half the months.

1,50

150 the debt.
1,50 the intereſt.

148,50 Anſ. 148 dols. 50 cts.

6. Bought goods to the amount of 950 dollars, at 90 days credit, what ready money will diſcharge it allowing the intereſt for the time at 6 per cent. per annum as diſcount ?

Anſ. 935 dollars 75 cents, if calculated for 3 months.
935 dollars 95 cents, if calculated for 90 days.

When the intereſt for the time is allowed as diſcount, it is preſumed that neither party ſuffers any loſs, but the following ſtatement evinces the contrary.

A owes B 100 dollars payable in 12 months, for preſent payment of which B allows 6 dollars or the intereſt for the time, and receives 94 dollars, this ſum he immediately lends to C for the ſame ſpace of time, and then receives the amount, being 99 dollars 64 cents, which is 36 cents leſs than he would have to receive from A had he left the money in his hands—but if he had allowed A the diſcount, and not the intereſt, for the time, he would have received from him 94 dols. 34 cts. and this ſum being put to intereſt, would amount to 100 dols. in one year, which ſhews that the diſcount and not the intereſt, is the juſt deduction for prompt payment.

But when diſcount is to be made for preſent payment, without any regard to time, the intereſt of the ſum, as calculated for a year, is the diſcount.

EXAMPLES.

7. How much is the diſcount of 853 dols. at 2 per cent?

853
2

dols. 17,06

Anſ. 17 dols. 6 cts.

8. How much money is to be received for 985 dols. 75 cts. diſcounting 4 per cent? Anſ. 946 dols. 32 cents.

BANK DISCOUNT.

THE method uſed among bankers, in diſcounting notes, &c. is, to find the intereſt of the ſum, from the date of the note to the time when it becomes due, including the days of grace; the intereſt thus found is reckoned the diſcount. Thus, if a note for 100 dollars, dated the 2d September, be diſcounted at a bank, for 30 days, the intereſt of that ſum for 33 days being 55 cts. is deducted for diſcount. It may be aſked, why intereſt for 33 days is calculated on a note for 30, the anſwer is, that as cuſtom has allowed the borrower three days of grace—that is, though the time of the note expires on the 1ſt of October (the day of the date being included in the 30 days) he may withhold the payment till the 4th—it is therefore reaſonable that he ſhould pay intereſt for it.

If a note of 100 dollars were diſcounted at a bank for 60 days, the intereſt of that ſum for 63 days being 105 cents, would be deducted for the ſame reaſon.

In caſe payment of a note be not convenient at the proper time, a new note muſt be preſented on the day of diſcount, immediately preceding the expiration of the time, paying the ſame diſcount or inter-

eſt for the time, as before ſtated. Thus, a note of 100 dollars, dated October 7th, 1800, for 30 days, though it is not payable till November 8th, yet muſt be replaced by a new note on Tueſday, November 4th, paying at the ſame time 55 cents. A note of the ſame date, for 100 dollars for 60 days, though not payable till Monday, December 8th (including in this time the days of grace) muſt be replaced by a new note on Tueſday, December 2d, paying likewiſe 105 cents. In the former caſe the borrower ſuſtains a loſs of 5 days in 30, and in the latter 7 days in 60 by renewing. All Banks have their ſtated times of diſcount, generally once in a week. In the preceding caſes, the Bank is ſuppoſed to diſcount on Tueſday. Some Banks diſcount twice a week—but this is for the convenience of loaning and not of renewing.

The diſcount of any ſum, diſcounted for 30 or 60 days, is found by multiplying it by one ſixth of the days. [See intereſt, page 107.]

EXAMPLES.

1. How much is the intereſt of 238 dols. diſcounted for 30 days?

238
,5½ = ⅚ of 33 days.

1190
119

1;30,9

Anſ. 1 dol. 30 cts. 9 ms.

2. What is the intereſt of 564 dols. diſcounted for 60 days?

564
1,0½ = ⅙ of 63 days

5640
282

5,92,2

Anſ. 5 dols. 92 cts. 2 ms.

What is the diſcount of the following ſums, viz.

	dols.			*dols. cts. ms.*
3.	159	diſcounted for 30 days.	Anſ.	0 87 4
4.	273	do.		1 50 1
5.	683	do.		3 75 6
6.	789	do.		4 33 9
7.	2194	do.		12 06 7
8.	219	diſcounted for 60 days.		2 29 9
9.	187	do.		1 96 3
10.	319	do.		3 34 9
11.	658	do.		6 90 9
12.	2169	do.		22 77 4

13. How much is the diſcount of a debenture of 319 dollars, payable in 210 days, diſcounting for 30 days?

NOTE. 28 days are allowed for a month, intereſt being calculated as if the note were renewable.

28)210(7 mo.
196
14 days

319
,5½=⅙ of 33 days
1595
159
1,75,4 for 1 month
7
12,27,8 for 7 months
14d. ½mo. 877
13,15,5
Anſ. 13 dols. 15 cts. 5 m.

14. What is the diſcount of the above ſum, diſcounting for 60 days?

NOTE. As notes are renewable in 56 days, the intereſt of all ſecurities is calculated accordingly.

56)210(3 diſcount months
168
42 days

319
1,0½=⅙ of 63 days
3190
159
3,34,9 for 1 diſc. mo.
3
10,04,7 for 3 ditto
28d. ½mo. 1,67,4
14 ¼ 83,7
12,55,8
Anſ. 12 dols. 55 cts. 8 m.

The preceding examples ſhew the difference between diſcounting for 30 and 60 days.

What is the diſcount of the following ſums, diſcounting for 30 days?

	dols.		*days.*		*dols.*	*cts.*	*m.*
15.	187	for	79	Anſ.	2	90	0
16.	219		115		4	91	5
17.	658		47		6	7	4
18.	2169		128		54	53	2

What is the diſcount of the following ſums, diſcounting for 60 days?

	dols.		*days.*		*dols.*	*cts.*	*m.*
19.	187	for	79	Anſ.	2	76	8
20.	219		115		4	72	2
21.	658		47		5	79	8
22.	2169		128		52	5	4

When a note is offered at a bank for diſcount, two endorſers are generally required, to the firſt of whom it is ſaid to be payable: thus—A having occaſion for a ſum of money, procures B and C as endorſers to his note, and offers it for diſcount in the following form.

100 dollars. ——, ——

For value received, I promiſe to pay B, or order, at the —— Bank, on demand, one hundred dollars, with intereſt after —— days.

A.

When State notes, bank ſhares, &c. are lodged in a bank as ſecurity for monies, a note is preſented in this form,

For value received, I promiſe to pay the Preſident, Directors and Company of the —— Bank, or their order, at ſaid Bank on demand, —— dollars, with intereſt after —— days. C D.

EQUATION OF PAYMENTS.

THE deſign of this Rule is to find a mean time for the payment of ſeveral ſums due at different times.

RULE. Multiply each ſum by its time, and divide the ſum of the products by the whole debt; the quotient is accounted the mean time.

EXAMPLES.

1. A owes B 200 dollars, whereof 40 dollars is to be paid in 3 months, 60 dollars in 5 months, and the remainder in 10 months, at what time may the whole be paid without any injuſtice to either?

dols.	*mo.*	
40	× 3	= 120
60	× 5	= 300
100	× 10	= 1000
200		1420

7 months and 3 days.

2. A is indebted to B £.120, whereof one half is to be paid in 3 months, one quarter in 6 months, and the remainder in 9 months, what is the equated time for the payment of the whole?

Anſ. 5 months and $7\frac{1}{2}$ days.

3. C owes D 1400 dollars, to be paid in 3 months, but D being in want of money, C pays him, at the expiration of 2 months, 1000 dollars, how much longer than 3 months ought C, in equity, defer the payment of the reſt? Anſ. $2\frac{1}{2}$ months.

Thoſe who are exact in theſe calculations, find the preſent worth of each particular ſum, then find on what time theſe preſent worths will be increaſed to the total of the particular ſums payable at the particular times to come; and that is the true equated time for payment of the whole.

BARTER

Is the exchanging one commodity for another on ſuch terms as may be agreed on.

EXAMPLES.

1. How many quintals of fiſh, at 2 dols. per quintal, will pay for 140 hhds. of ſalt, at 4 dols. 70 cts. per hhd.

140
4,70

9800
560

658,00 the amount of the ſalt.

dols. *qtl.*
If 2 : 1 :: 658,00

Anſ. 329 quintals.

2. A buys of B 4 hhds. of rum containing 410 gallons, at 1 dol. 7 cts. per gallon; and 253 lb. of coffee, at 21 cts. per lb. in part of which he pays 21 dollars in caſh, and the balance in boards, at 4 dols. per thouſand; how many feet of boards did the balance require?

Anſ. 127957½ feet.

3. B has C's note for 250 dols. with 6 months intereſt due on it, and to redeem it C delivers him 60 buſhels of wheat at 7*s.* 6*d.* per buſhel, 50 buſhels of corn at 5*s.* 3*d.* per buſhel, and the balance in ſtaves at 30 dols. per thouſand; what number of ſtaves did B receive? Anſ. 5550 ſtaves, or 4 m. 6 hun. and 10 caſts.

4. B bought of D the hull of a ſchooner of 70 tons, at 16 dols. per ton, and paid him in caſh 500 dols. 3 hhds. of molaſſes containing 350 gallons, at 64 cts. and is to pay the balance in New-England rum at 74 cts. per gallon; how many gallons is D to receive?

Anſ. 535 $\frac{5}{37}$ gallons.

5. A buys of B 250 quintals of fiſh, at 25*s.* per quintal; in payment B takes 100 dols. in caſh, 2 hhds. of molaſſes containing 87 and 92 gals. at 3*s.* 8*d.* per gallon, 1 pipe of brandy containing 120 gals. at 7*s.* 6*d.* per gallon, and gives 3 months credit for the remainder; required the balance due, and what caſh would pay it, allowing the intereſt of it for the time at 6 per cent. per annum, as diſcount for prompt payment?

Anſ. the balance is 672 dols. 4 cts. 2 m.

6. C ſells to D 28,674 feet of boards at 8 dols. 50 cts. per thouſand, and takes in payment $\frac{1}{3}$ caſh, 4 barrels N. E. rum containing 128 gallons at 78 cents per gallon, 1 barrel of ſugar weighing neat 2 cwt. 2 qrs. 4 lb. at 10 dollars per cwt. and the balance in coffee at 25 cts. per lb.; how much money and coffee is C to receive?

Anſ. 37 dols. 28 cts. 9 mills, and 149$\frac{39}{250}$ lb. of Coffee.

7. C has nutmegs worth 7*s.* 6*d.* per lb. in ready money, but in barter he will have 8*s.*; D has tobacco worth 9*d.* per lb.; how much muſt he rate it per lb. that his profit may be equal to C's?

Anſ. 9$\frac{3}{5}$*d.*

8. A has tea, which he barters with B at 10*d.* per lb. more than it coſt him, againſt cambrick which ſtands B in 10*s.* per yard, but he puts it at 12*s.* 6*d.*; I would know the firſt coſt of the tea.

Anſ. 3*s.* 4*d.* per lb.

9. A has 240 buſhels of rye, which coſt him 90 cts. per buſhel; this he barters with B at 95 cts. for wheat that ſtands B in 99 cents per buſhel; how many buſhels of wheat is he to receive in barter, and at what price is it to be rated. that their gains may be equal?

Anſ. 218$\frac{18}{209}$ buſhels, at 104$\frac{1}{2}$ cts. per buſhel.

10. A and B barter ſome goods—A put his at 30$\frac{6}{25}$ ſhillings, and gains 8 per cent. B puts his at 24$\frac{3}{10}$ ſhillings, and gains at the ſame rate; what was the firſt coſt of the goods?

Anſ. 28*s.* and 22*s.* 6*d.*

11. A and B barter; A has cloth that coſt 28*d.* B's coſt him 22*d.* and he puts it at 25*d.*; how high muſt A put his to gain 10 per cent more than B?

Anſ. 35*d.*

12. C and D barter—C makes of 7*s.* 6*s.* 8*d.* D makes of 7*s.* 6*d.* 7*s.* 3*d.*; who has loſt moſt, and by how much per cent?

Anſ. C loſes 1$\frac{3}{7}$ per cent. more than D.

LOSS AND GAIN

Is a rule that diſcovers what is gained or loſt in buying or ſelling goods, and inſtructs merchants and traders to raiſe or fall the price of their goods ſo as to gain or loſe ſo much per cent. &c.

EXAMPLES.

1. Bought a piece of broadcloth containing 53 yds. at 4 dols. 65 cts. per yd. and ſold at 5 dols. per yd. what is the profit on the whole?

dols. cts.
5
4,65

yd. yds.
If 1 : ,35 :: 53
35
265
159
18,55 Anſ. 18 dols. 55 cts.

2. If 1 lb. of coffee coſt 28 cts. and is ſold for 31 cts. what is the profit on 3 bags, weighing 293 lbs. neat?
Anſ. 8 dols. 79 cts.

3. Bought a piece of baize of 42 yds. for £.4 14 6 and ſold it at 2*s*. 6*d*. per yd. what is the gain or loſs on the whole piece?
Anſ. 10*s*. 6*d*. gain.

4. A merchant bought 59 cwt. 3 qr. 14 lb. of iron, at 112 dollars per ton, paid freight and charges, 24 dols. what is the gain or loſs, if he ſells the whole at 37*s*. 4*d*. per cwt.?
Anſ. 13 dols. 26 cts. gain.

5. If a gallon of wine coſt 6*s*. 8*d*. and is ſold for 7*s*. 2*d*. what is the gain per cent.?

7 2
6 8
s. *d*. *£*.
If 6 8 : 6 :: 100 Anſ. 7½ per cent. gain.

6. When 20 per cent. loſs is made on coffee, ſold at 20 cents per lb. what was the firſt coſt? Anſ. 25 cents.

7. At 13½ cents profit on the dollar, how much is it per cent.?
Anſ. 13½ per cent or 13 dols. 50 cts. per 100 dols.

8. A trader ſells his goods a [illegible]½*d*. profit on the ſhilling, how much is it per cent.? Anſ. 20⅚, or £.20 16 8.

9. Which is the better bargain, in purchaſing fiſh, 17 ſhillings per quintal, and 4 months credit, or 16*s.* 8*d.* caſh ?

Anſ. They are alike.

PROOF. The preſent worth of 17*s.* found by diſcount, is equal to 16*s.* 8*d.* and 16*s.* 8*d.* with 4 months intereſt will amount to 17*s.*

10. A bought a piece of ſhalloon containing 34 yds. at 3*s.* 4*d.* per yard, and ſold it at 12½ per cent. loſs, how much did he ſell it per yard ?

Anſ. 2*s.* 11*d.*

11. Bought rum at 90 cts. per gallon, at what rate muſt it be ſold to gain 20 per cent. ?

Anſ. 108 cts.

12. A trader bought a hogſhead of rum, at a certain proof, containing 115 gallons, at 1 doll. 10 cts. per gallon, how many gallons of water muſt be put into it to gain 5 dols. by ſelling it at 1 doll. per gallon ?

Anſ. 16½ gallons.

13. Bought 4 hogſheads of rum, containing 450 gallons, at 1 dollar per gallon, and ſold it at 1 doll. 20 cts. per gallon, and gave 3 months credit ; now allowing the leakage of the rum while in my poſſeſſion to be 10 gallons, I would know the gain or loſs, diſcounting for the preſent worth of the debt at 6 per cent. per annum.

Anſ. 79 dols. 19 cts. gain.

14. A [illegible] 308 gallons of wine, at 6*s.* 3*d.* per gallon, on ſhip-board, and ſold it immediately at 8*s.* 3*d.* per gallon, payable in 3 mos. ; how much is B's gain or loſs, ſuppoſing he allows the intereſt for the time at 6 per cent. per annum, as diſcount for preſent payment ?

Anſ. £11 1ſ. 8 gained.

15. What would be the gain or loſs on the aforeſaid wine, ſuppoſing the diſcount or preſent payment to be made at 2 per cent. without any regard to time ?

Anſ. £10 1ſ. 6½ gain.

16. A merchant bought a parcel of cloth at the rate of 1 dollar for every 2 yards, and ſold a certain quantity at the rate of 3 dollars for every 5 yards, and thereby found he had gained as much as [illegible]

Anſ. 90 yards.

17. [illegible] gallons, which not [illegible] 28 per cent. by [illegible]

Anſ. 1 doll. 25 cts.

18. [illegible] bushel, and gains [illegible] the amount of [illegible] how many bushels were [illegible] bushel ?

Anſ. 80 bushels 1 peck 15 lbs. per bushel.

19. A diſtiller is about purchaſing 10000 gallons of molaſſes, which he can have at 48 cts. per gallon, in ready money, or 50 cts. with 2 months credit, it is required to know which is more advantageous to him, either to buy it on credit, or to borrow the money at 8 per cent. per annum to pay the caſh price?

Anſ. He will gain 136 dols. by paying the caſh.

20. A tobacconiſt buys 4 hogſheads of tobacco weighing 38 cwt. 2 qrs. 8 lb. groſs, tare 94 lb. per hogſhead, at 9 dollars per cwt. ready money, and ſells it at $11\frac{1}{2}d.$ per lb. allowing tare at 14 lb. per cwt. to receive two-thirds in caſh, and for the remainder a note at 90 days credit; his gain or loſs is required, ſuppoſing the note is diſcounted at a bank where diſcount is made for 60 days?

Anſ. 283 dols. 43 cts. gain.

ALLIGATION MEDIAL

Is when the quantities and prices of ſeveral things are given, to find the mean price of the mixture compounded of thoſe things.

Rule. As the ſum of the quantities or whole compoſition is to their total value, ſo is any part of the compoſition to its mean price.

Examples.

1. A grocer would mix 25 lb. of raiſins, at 8 cents per lb. and 35 lb. at 10 cts. per lb. with 40 lb. at 12 cts. per lb.—what is one pound of this mixture worth?

lb.		*cts.*		*cts.*
25	at	8		200
35		10		350
40		12		480
100				1030

	lb.		*cts.*		*lb.*
If	100	:	1030	: :	1
			1		

1|00)10|30

cts. 10 3 Anſ. 10 cts. 3 mills.

2. A goldſmith mixes 8 lb. $5\frac{1}{4}$ oz. of gold, of 14 carats fine, with 12 lb. $8\frac{1}{2}$ oz. of 18 carats fine; what is the fineneſs of this mixture? Anſ. $16\frac{5}{17}$ carats.

3. A grocer would mix 12 cwt. of ſugar at 10 dols. per cwt. with 3 cwt. at $8\frac{1}{2}$ dols. per cwt. and 8 cwt. at $7\frac{1}{2}$ dols. per cwt. what will 5 cwt. of this mixture be worth?

Anſ. 44 dols. 78 cts. 2 mills.

4. A refiner melts $2\frac{1}{2}$ lb. of gold, of 20 carats fine, with 4 lb. of 18 carats fine; how much alloy muſt he put to it, to make it 22 carats fine? Anſ. It is not fine enough by $3\frac{3}{13}$ carats, ſo that no alloy muſt be put to it, but more gold.

5. A maltſter mingles 30 quarters of brown malt, at 28*s.* per quarter, with 46 quarters of pale, at 30*s.* per quarter, and 24 quarters of high dried ditto, at 25*s.* per quarter; what is the value of 8 buſhels of this mixture? Anſ. £.1 8*s.* $2\frac{1}{4}d.\frac{1}{3}$

6. If I mix 27 buſhels of wheat, at 5*s.* 6*d.* the buſhel, with the ſame quantity of rye, at 4*s.* per buſhel, and 14 buſhels of barley, at 2*s.* 8*d.* per buſhel, what is the worth of a buſhel of this mixture?

Anſ. 4*s.* $3\frac{1}{4}d.\frac{3}{13}$

7. A grocer mingled 3 cwt. of ſugar, at 56*s.* per cwt. 6 cwt. at £.1 17 4 per cwt. and 3 cwt. at £.3 14 8 per cwt. what is 1 cwt. of this mixture worth? Anſ. £.2 11 4

8. A mealman has flour of ſeveral ſorts, and would mix 3 buſhels at 3*s.* 5*d.* per buſhel, 4 buſhels at 5*s.* 6*d.* per buſhel, and 5 buſhels at 4*s.* 8*d.* per buſhel, what is the worth of a buſhel of this mixture? Anſ. 4*s.* 7*d.* $\frac{1}{2}$, $\frac{5}{12}$.

9. A vintner mixes 20 gallons of Port at 5*s.* 4*d.* per gallon, with 12 gallons of White wine at 5*s.* per gallon, 30 gallons of Liſbon at 6*s.* per gallon, and 20 gallons of Mountain at 4*s.* 6*d.* per gallon, what is a gallon of this mixture worth?

Anſ. 5*s.* 3*d.* $\frac{3}{4}$, $\frac{10}{12}$.

10. A farmer mingled 20 buſhels of wheat at 5*s.* per buſhel, and 36 buſhels of rye at 3*s.* per buſhel, with 40 buſhels of barley at 2*s.* per buſhel, I deſire to know the worth of a buſhel of this mixture?

Anſ. 3 ſhillings.

11. A perſon mixing a quantity of oats at 2*s.* 6*d.* per buſhel, with the like quantity of beans at 4*s.* 6*d.* per buſhel, would be glad to know the value of 1 buſhel of that mixture?

Anſ. 3*s.* 6*d.*

12. A refiner having 12 lb. of ſilver bullion of 6 oz. fine, would melt it with 8 lb. of 7 oz. fine, and 10 lb. of 8 oz. fine, required the fineneſs of 1 lb. of that mixture?

Anſ. 6 oz. 18 dwt. 16 grs.

13. If with 40 buſhels of corn at 4*s.* per buſhel, there are mixed 10 buſhels at 6*s.* per buſhel, 30 buſhels at 5*s.* per buſhel, and 20 buſhels at 3*s.* per buſhel, what will 10 buſhels of that mixture be worth? Anſ. £.2 3*s.*

ALLIGATION ALTERNATE

Is the method of finding what quantity of any number of ſimples, whoſe rates are given, will compoſe a mixture of a given rate; ſo that it is the reverſe of Alligation Medial, and may be proved by it.

RULE. 1. Write the rates of the ſimples in a column under each other.

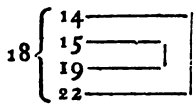
2. Connect or link with a continued line the rate of each ſimple which is leſs than that of the compound, with one, or any number, of thoſe that are greater than the compound, and each greater rate with one or any number of the leſs.

3. Write the difference between the mixture rate and that of each of the ſimples, oppoſite the rates with which they are linked.

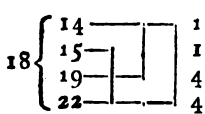
4. Then if only one difference ſtand againſt any rate, it will be the quantity belonging to that rate; but if there be ſeveral, their ſum will be the quantity.

EXAMPLES.

1. A merchant would mix wines at 14*s*. 19*s*. 15*s*. and 22*s*. per gallon, ſo as that the mixture may be worth 18*s*. the gallon; what quantity of each muſt be taken?



Or thus,



NOTE. Queſtions in this rule admit of a great variety of anſwers, according to the manner of linking them.

2. How much wine, at 6*s*. per gallon, and at 4 ſhillings per gallon, muſt be mixed together, that the compoſition may be worth 5*s*. per gallon? Anſ. 1 qt. or 1 gal. &c.

3. How much corn, at 2*s*. 6*d*. 3*s*. 8*d*. 4*s*. and 4*s*. 8*d*. per buſhel, muſt be mixed together, that the compound may be worth 3*s*. 10*d*. per buſhel? Anſ. 12 at 2*s*. 6*d*. 12 at 3*s*. 8*d*. 18 at 4*s*. and 18 at 4*s*. 8*d*.

4. A goldſmith has gold of 17, 18, 22, and 24 carats fine; how much muſt he take of each to make it 21 carats fine?
Anſ. 3 of 17, 1 of 18, 3 of 22, and 4 of 24.

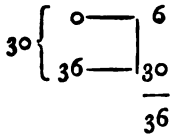
5. It is required to mix brandy at 8*s*. wine at 7*s*. cider at 1*s*. and water together, ſo that the mixture may be worth 5*s*. per gallon?
Anſ. 9 gals. of brandy, 9 of wine, 5 of cider, and 5 of water.

When the whole compoſition is limited to a certain quantity.

RULE. Find an anſwer as before by linking; then ſay, As the ſum of the quantities, or differences thus determined, is to the given quantity, ſo is each ingredient, found by linking, to the required quantity of each.

EXAMPLES.

6. How many gallons of water muſt be mixed with wine worth 3*s.* per gallon, ſo as to fill a veſſel of 100 gallons, and that a gallon may be afforded at 2*s.* 6*d.* ?



36 : 100 :: 6
6

36)600(16
36

240
216

24

36 : 100 :: 30
30

36)3000(83
288

120
108

12

Anſ. $83\frac{1}{3}$ gallons of wine, and $16\frac{2}{3}$ of water.

7. A grocer has currants at 4*d.* 6*d.* 9*d.* and 11*d.* per lb. and he would make a mixture of 240 lb. ſo that it might be afforded at 8*d.* per lb. how much of each ſort muſt he take?

Anſ. 72 lb. at 4*d.* 24 at 6*d.* 48 at 9*d.* and 96 at 11*d.*

8. How much gold of 15, of 17, of 18, and of 22 carats fine, muſt be mixed together, to form a compoſition of 40 oz. of 20 carats fine?

Anſ. 5 oz. of 15, of 17, and of 18, and 25 oz. of 22.

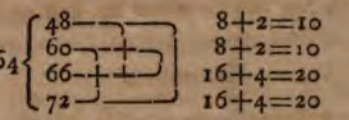
When one of the ingredients is limited to a certain quantity.

RULE. Take the difference between each price and the mean rate, as before; then,

As the difference of that ſimple, whoſe quantity is given, is to the reſt of the differences ſeverally, ſo is the quantity given, to the ſeveral quantities required.

EXAMPLES.

9. How much wine, at 5*s.* at 5*s.* 6*d.* and at 6*s.* the gallon, muſt be mixed with three gallons, at 4*s.* per gallon, ſo that the mixture may be worth 5*s.* 4*d.* per gallon?



10 : 10 :: 3 : 3
10 : 20 :: 3 : 6
10 : 20 :: 3 : 6

Anſ. 3 gallons at 5*s.*; 6 at 5*s.* 6*d.*; and 6 at 6*s.*

10. A grocer would mix teas at 12*s.* 10*s.* and 6*s.* with 20 lb. at 4*s.* per lb.; how much of each ſort muſt he take to make the compoſition worth 8*s.* per lb.?
Anſ. 20 lb. at 4*s.*; 10 lb. at 6*s.*; 10 lb. at 10*s.*; and 20 lb. at 12*s.*

11. How much gold of 15, of 17, and of 22 carats fine, muſt be mixed with 5 oz. of 18 carats fine, ſo that the compoſition may be 20 carats fine?

Anſ. 5 oz. of 15 carats fine, 5 oz of 17, and 25 of 22.

POSITION.

POSITION is a rule, which, by falſe or ſuppoſed numbers, taken at pleaſure, diſcovers the true one required. It is divided into two parts, SINGLE and DOUBLE.

SINGLE POSITION

Is, by uſing one ſuppoſed number, and working with it as the true one, you find the real number required by the following

RULE. As the total of the errors is to the given ſum, ſo is the ſuppoſed number to the true one required.

PROOF. Add the ſeveral parts of the reſult together, and if it agrees with the given ſum, it is right.

EXAMPLES.

1. A ſchool-maſter, being aſked how many ſcholars he had, ſaid, If I had as many, half as many, and one quarter as many more, I ſhould have 264; how many had he?

Suppoſe he had	72
as many	72
$\frac{1}{2}$ as many	36
$\frac{1}{4}$ as many	18

As 198 : 264 :: 72

72

528
1848

198)19008(96 Anſwer.
1782

1188
1188

Proof.
96
96
48
24
264

2. A perſon, after ſpending $\frac{1}{3}$ and $\frac{1}{4}$ of his money, had 60 dollars left; what had he at firſt? Anſ. 144 dols.

3. A certain ſum of money is to be divided between 4 perſons, in ſuch a manner, that the firſt ſhall have $\frac{1}{3}$ of it, the ſecond $\frac{1}{4}$, the third $\frac{1}{6}$, and the fourth the remainder, which is 28 dollars; what was the ſum? Anſ. 112 dols.

4. A perſon lent his friend a ſum of money unknown, to receive intereſt for the ſame, at 6 per cent. per annum, ſimple intereſt, and at the end of 5 years he received for principal and intereſt 644 dols. 80 cents; what was the ſum lent? Anſ. 496 dollars.

DOUBLE POSITION

Is, by making uſe of two ſuppoſed numbers, which, if both prove falſe, are, with their errors, to be thus diſpoſed;

RULE. 1. Place each error againſt its reſpective poſition.

2. Multiply them croſs-wiſe.

3. If the errors are alike, that is, both greater or both leſs than the given number, divide the difference of the products by the difference of the errors, and the quotient is the anſwer: But if the errors be unlike, divide the ſum of the products by the ſum of the errors, and the quotient will be the anſwer.

EXAMPLES.

1. B aſked C how much his horſe coſt; C anſwered, that if he coſt him three times as much as he did, and 15 dollars more, he would ſtand him in 300 dollars; what was the price of the horſe?

	dols.		*dols.*
Suppoſe he coſt	90	Suppoſe he coſt	96
	3		3
	270		288
	15		15
	285 too little by 15 dols.		303 too much by 3 dols.

90 15—

X

96 3+

15	1440	270
3	270	

Sum of the errors 18) 1710 (95 anſwer

162

90

90

95

3

285

15

300 proof.

2. Two perſons, A and B, have both the ſame income; A ſaves one-fifth of his yearly; but B, by ſpending 150 dollars per annum more than A, at the end of 8 years finds himſelf 400 dollars in debt; what is their income, and what does each ſpend per annum?

Anſ. Their income is 500 dollars per annum; alſo A ſpends 400, and B 550 dollars per annum.

3. There is a fiſh whoſe head is 9 inches long, and his tail is as long as his head and half his body, and his body is as long as the head and tail; what is the whole length of the fiſh? Anſ. 6 feet.

4. Divide 15 into two ſuch parts, ſo that when the greater is multiplied by 4, and the leſs by 16, the products will be equal.

Anſ. 12 and 3.

5. A man had two ſilver cups of unequal weight, having one cover to both, 5 oz.; now if if the cover is put on the leſs cup it will be double the weight of the greater cup, and put on the greater cup it will be three times as heavy as the leſs cup: what is the weight of each cup? Anſ. 3 oz. leſs—4 oz. greater.

6. A perſon being aſked, in the afternoon, what o'clock it was, anſwered that the time paſt from noon was equal to $\frac{2}{13}$ of the time to midnight; required the time? Anſ. 36 minutes paſt one.

EXCHANGE.

EXCHANGE is the paying of money in one place or country, for the like value to be received in another place or country.

There are two kinds of money, viz. Real, and Imaginary.

Real money is a piece of metal coined by the authority of the State, and current at a certain price, by virtue of the ſaid authority, or of its own intrinſic value.

Imaginary money is a denomination uſed to expreſs a ſum of money of which there is no real ſpecies, as a *livre* in France, a *pound* in America, becauſe there is no ſpecies current, in this or that country, preciſely of the value of either of the ſums.

Par of Exchange is the intrinſic value of the money of one country compared with that of another country, as one pound ſterling is equal to thirty-five ſhillings Flemiſh.

Courſe of Exchange is the current or running price of exchange, which is ſometimes above, and ſometimes below par, varying according to the occurrences of trade, or demand for money. Of this courſe, there are tables publiſhed daily in commercial cities: thus by Lloyd's Liſt, of 3d. December, 1799, the courſe of exchange between Hamburgh and London, was 32*s.* 6½*d.* Flemiſh, per pound ſterling, being 2*s.* 5½*d.* under par, or loſs to London.

GREAT-BRITAIN.

The money of account is pounds, ſhillings, pence, and farthings.
The Engliſh Guinea is 21 ſhillings Sterling.
Weights and meaſures generally as in the United States.

To change Sterling to Federal money.

RULE. Annex three cyphers to the ſum (if pounds only) and multiply it by 4; this product divide by 9, and you have the anſwer in cents. If there be ſhillings, &c. the uſual method is to reduce it to Maſſachuſetts money, by adding one third to it, and then reduce this ſum to Federal.

EXAMPLES.

1. Change £.48 Sterling to Federal.

48000
4
9)192000
21333⅓ cts. Anſ. 213 dols. 33⅓ cts.

2. Change £.389 17 4½ Sterl. to Federal, exchange at 33⅓ per cent. that is, £.133⅓ Maſſachuſetts for £.100 Sterling.

⅓)389 17 4½ Sterling.
129 19 1½ Exchange.

519 16 6 Maſſ.

,3)519,825

Cts. 173275 Federal. Anſ. 1732 dols. 75 cts.

NOTE. Sterling is changed to Maſſachuſetts money by adding one-third to the ſum, and Maſſachuſetts to Sterling by deducting one-fourth from it.

To change Federal Currency to Sterling.

RULE. Work by either of the following methods.

EXAMPLES.

Change 1732 dols. 75 cts. to Sterling.

First Method.

	1732		
4s. ⅕	346	8	
6d. ⅛	43	6	
50 cents		2	3
25		1	1½
Anſ.	£.389	17	4½

Second Method.

1732,75
,3

519|825
20

16|500
12

6|000

¼)519 16 6 Maſſ.
129 19 1½ Exchange.

Anſ. £.389 17 4½ Sterling.

1. What is the Federal amount of an invoice of goods, charged at £.196 14 6 Sterl. advancing on it 25 per cent. ?

25 ¼)196 14 6 Sterling.
49 3 7½ Advance.

245 18 1½
Exchange at 33⅓ per cent. 81 19 4½

£.327 17 6 Maſſ.

3)327875

cts. 109291⅔ Anſ. 1092 dols. 91⅔ cts.

2. The Sterling coſt of certain goods being £.60 12 6, what does it amount to in Maſſachuſetts money, advancing on it 50 per ct.?

60 12 6
50 per cent. advance 30 6 3

90 18 9
Exchange at 33⅓ per cent. 30 6 3

Anſ. £.121 5 0 Maſſ. money.

The mercantile method, with 50 per cent. advance, is to double the Sterling for Maſſachuſetts money ; thus,

60 12 6 Sterl.
2

£.121 5 0 Maſſ. as above.

3. An invoice of goods, charged at £.52 19 7 ſterling, is ſold at 75 per cent. advance on the ſterling coſt, how much is it in Maſſachuſetts money ?

52 19 7
Advance at 50 26 9 9½
25 13 4 10¼

92 14 3¼
Exchange at 33⅓ per cent. 30 18 1

Anſ. £.123 12 4¼ Maſſachuſetts money.

The mercantile method, with 75 per cent. advance, is to multiply the ſterling by 2⅓ for Maſſachuſetts money.

Thus, 52 19 7 ſterling
2⅓

105 19 2
17 13 2¼

£.123 12 4¼ Maſſach[illegible]money, as above.

4. The ſterling coſt of certain goods being £.214 11 6, how much is it in Federal money, advancing thereon 60 per cent.?

		214	11	6	
50	½	107	5	9	} advance
10	⅕	21	9	1¼	}
		343	6	4¼	
Exchange	⅓	114	8	9½	
		457	15	2¼	Maſſachuſetts.

Or thus,		214	11	6	Sterling
Exchange	⅓	71	10	6	
		286	2	0	
50	½	143	1	0	
10	⅕	28	12	2¼	
		457	15	2¼	Maſſachuſetts

3)457,759

Dollars 1525,86⅓ Anſ. 1525 dols. 86⅓ cts.

5. A merchant in Boſton receives a parcel of goods from London, charged in the invoice at the following prices, and marks them for ſale at 60 per cent. advance on the Sterling coſt; required the ſelling price of each in Maſſachuſetts money.

s.	*d.*		*s.*	*d.*		*dols.*	*c.*	*m.*
13	8	Sterling, adv. 60 per ct.	29	1½	Maſſ. money, or	4	85	3
5	10		12	5¼		2	7	3
3	4		7	1¼		1	18	3
6	1½		13	0¼		2	17	6
17	0		36	3		6	4	
33	1		70	6½		11	75	6
1	2		2	5½			41	
18	10		40	2		6	69	4
11			23	5½		3	91	
2	4		4	11¼			82	3
32	3		68	9½		11	46	6
27	9		59	2¼		9	86	3

6. A watch that coſt 15 guineas in London, was ſold in Boſton at 50 per cent. advance on the Sterling coſt, what was the price?

15 guineas=£.15 15 0 Sterling
2

31 10 0 Maſſachuſetts

,8)31,5

Anſ. 105 dollars.

7. How much is the premium of inſuring £.294 at 8 guineas per cent.? Anſ. £.24 13 11

Mercantile Methods of calculating, viz.

At 25 per ct. diſc. from the ſterl. coſt, multiply it by 1 for the anſ. in [Maſſ. money.

10		$1\frac{1}{5}$
par		$1\frac{1}{4}$
$12\frac{1}{2}$ per ct. adv. on the ſterl. coſt, multiply it by		$1\frac{1}{2}$
25		$1\frac{3}{4}$
$31\frac{1}{4}$		$1\frac{7}{8}$
50		2
$62\frac{1}{2}$		$2\frac{1}{8}$
65		$2\frac{1}{4}$
75		$2\frac{3}{8}$
$87\frac{1}{2}$		$2\frac{1}{2}$
100		$2\frac{3}{4}$
125		3
140		$3\frac{1}{4}$
150		$3\frac{1}{3}$
$162\frac{1}{2}$		$3\frac{1}{2}$
175		$3\frac{2}{3}$
200		4

I R E L A N D.

The money of account as in England, but different in value. The par between England and Ireland is $8\frac{1}{3}$ per cent. that is, £.100 Sterling money is £.108 6 8 in Ireland.

Mercantile weights and meaſures, the ſame as in England.

The United States dollar is equal to 4*s*. 10$\frac{1}{2}$*d*. Iriſh.

The Engliſh guinea is equal to 22*s*. 9*d*. Iriſh.

To reduce Iriſh money to Federal.

Rule. Reduce the given ſum to half pence, annex two cyphers to it, and then divide by 117, (the half pence in a dollar) and the quotient is the anſwer in cents. Or, reduce the Iriſh to Sterling, by deducting $\frac{1}{13}$ from it, and then work as for Sterling.

EXAMPLE.

Change £.278 15 9 Iriſh money to Federal.

First method.

278 15 9
20
5575
12
66909
2
9)1338180
9×13=117
13)1486866
114374 cts.

Second method.

⅓)278 15 9 Iriſh
21 8 11 Exchange
257 6 10 Sterling
85 15 7¼
343 2 5¼ Maſſ.
3)343,122
1143,74 cents

Anſ. 1143 dols. 74 cts.

To change Federal money to Iriſh.

RULE. Multiply the given ſum by 117, reject two figures from the product to the right hand, and the remaining figures are the half pence in the given ſum.

1. Change 1143 dols. 74 cts. to Iriſh.

114374
117
8006 18
114374
114374
2)133817|58
12)66908¼
20)5571|5 8

Anſ. £.278 15 8¼

If the ſum is dollars only, work by either of the following methods.

2. Change 1537 dollars to Iriſh.

First method.

1537 at 4s. 10½d.

4s. ½ 307 8
8d. ⅙ 51 4 8
2 ¼ 12 16 2
½ ¼ 3 4 0½
Anſ. £.374 12 10½

Second method.

1537
3
461 2 Maſſachuſetts
¼ 115 5 6 Exchange at 25 per ct.
345 16 6 Sterling
1/12 28 16 4½ Ex. 8⅓ per ct. or 1d. on 1s.
£.374 12 10½

In changing Sterl. to Iriſh money at par, $\frac{1}{12}$ is added to the ſum for Iriſh; and in changing Iriſh to Sterling, $\frac{1}{13}$ is deducted for Sterling, becauſe 12 pence Engliſh are equal to 13 pence Iriſh, making the Exchange 1*d.* in a ſhilling, 1*s.* 8*d.* in a pound, and £.8 6 8 per cent.

EXAMPLES.

1. Change £.394 17 6 Sterling to Iriſh, at par, or £.8$\frac{1}{3}$ per cent.

$\frac{1}{12}$)394 17 6
32 18 1$\frac{1}{2}$

Anſ. £.427 15 7$\frac{1}{2}$ Iriſh

2. Change £.427 15 7$\frac{1}{2}$ Iriſh money to Sterling, at 8$\frac{1}{3}$ per cent. in favour of England.

$\frac{1}{13}$)427 15 7$\frac{1}{2}$
32 18 1$\frac{1}{4}$

Anſ. £.394 17 6 Sterling.

3. Change £.370 Sterling to Iriſh, at 9 per cent.

£. £. £.
100 : 109 :: 370 Anſ. £.403 6 0

4. Reduce £.403 6 Iriſh money to Sterling, at 9 per cent.

9
100

£. s.
109 : 100 :: 403 6 Anſ. £.370

HAMBURGH.

Accounts are kept in Hamburgh in Marks, Shillings Lubs or Stivers, and Deniers.

12 deniers, or 2 grotes, make 1 ſhilling lubs, or ſtiver.
16 ſhillings lubs, ſtivers, or 32 grotes } 1 mark.

ALSO,

12 grotes or pence Flemiſh make 1 ſhilling Flemiſh.
20 ſhillings Flemiſh 1 pound.

NOTE. 3 marks make 1 rix dollar.
7$\frac{1}{2}$ do. - - - 1 pound Flemiſh.
A ſhippound in Hamburgh 280 lb.
A ring of ſtaves do. - 240
100 lb. in Hamburgh - 107$\frac{1}{4}$ lb. in U. States.
100 ells do. - - 62$\frac{1}{2}$ yards.

The currency of Hamburgh is inferior to the bank money; the *agio*, or rate, is variable; May 14th, 1798, it was 20 per cent. in favour of the bank.

The mark banco is 33⅓ cents; (ſee laws of the United States.)

EXAMPLES.

1. Change 12843 marks to Federal, at 33⅓ cts. per mark.

33⅓=⅓)12843

Anſ. 4281 dollars.

2. In 4967 marks 8 ſtivers banco, how many dollars, exchange as above?

33⅓=⅓)4967,

1655,66½

8 ſtivers ,16½

Dols. 1655,83

Anſ. 1655 dols. 83 cts.

To change Hamburgh money to Sterling.

RULE. As the given rate is to one pound, ſo is the Hamburgh ſum to the Sterling required.

EXAMPLES.

1. Change 2443 marks 9½ ſtivers to Sterling, exchange at 32*s.* 6*d.* Flemiſh per pound Sterling.

s.	*d.*		£.		*m.*	*ſt.*
32	6	:	1	::	2443	9½
12 grotes.					32	2
390					4886	19 grotes.
					7329	
					19	
					78195	
					1	

390)78195(200£.
780

195
20

390)3900(10 *s.*
3900

Anſ. £.200 10 0.

2. In 12093 marks 12 ſtivers how many pounds ſterling, exchange at 32*s.* 3*d.* Flemiſh per pound Sterling? Anſ. £.1000.

3. In 4178 marks 2 ſtivers how many pounds Sterling, exchange at 31*s.* 10*d.* Flemiſh per pound Sterling? Anſ. £.350.

4. Change 1971 marks 13 ſtivers to Sterling, exchange at 35*s.* 6*d.* Flemiſh per pound Sterling. Anſ. £.148 2 4.

To change Sterling to Hamburgh money.

RULE. As 1 pound Sterling is to the given rate, ſo is the Sterling ſum to the Hamburgh required.

EXAMPLES.

1. Charge £.350 Sterling to Hamburgh money, exchange at 31*s.* 10*d.* Flemiſh per pound Sterling.

£.		s.	d.		£.
1	:	31	10	::	350
		12			
		382		grotes.	
		350			
		19100			
		1146			
		2)133700		grotes.	
		16,66850		ſtivers.	
		4178	2	Anſ. 4178 marks 2 ſtivers.	

Proving the anſwers in the preceding caſe will further exemplify this.

To reduce Current to Bank money.

RULE. As 100 marks with the agio added, is to 100 bank, ſo is the current money to the bank required.

EXAMPLES.

1. Change 560 marks 8 ſtivers current to banco, agio at 18 per cent.

18
100
118 : 100 :: 560 8. Anſ. 475 marks.

2. Change 2366 marks current to banco, agio at 20 per cent.
Anſ. 1971 marks, 10⅗ ſtivers.

3. Change 7456 current marks to banco, agio at 22 per cent.
Anſ. 6111 marks, 7 ſtivers.

To change Bank to current money.

RULE. As 100 marks is to 100 with the agio added, ſo is the bank given to the current required.

EXAMPLES.

1. Change 475 marks banco to current, agio at 18 per cent.

18
100
m. m.
100 : 118 :: 475 Anſ. 560 marks, 8 ſtivers.

Or thus,

475
18
3800
475
85|50
16
8|00

475 bank.
85 8 agio.
560 8 as above.

2. Change 1971 marks, 10⅗ ſtivers banco to current, agio at 20 per cent.

m. s.
20 ⅕)1971 10⅗ banco.
394 5⅕ agio.
Anſ. 2366 0 current.

PRACTICAL QUESTIONS.

1. How much will 63152 lb. of cotton come to, at 8 grotes per lb. ?

lb. gr. lb.
1 : 8 :: 63152
8
2)507616 grotes
16)253808 ſtivers
Anſ. 15863 marks

2. What will 351 lb. of cotton come to at 50*d.* per lb. ?

NOTE. *d.* is the mark for pence Flemiſh, equal in value to half ſtivers or half ſhillings lubs.

lb. *d.* *lb.*
1 : 50 : : 351
50

2)17550 grotes or pence flemiſh.

16)8775 ſtivers.

548 7 Anſ. 548 marks, 7 ſtivers.

3. What will 339 bars Ruſſian iron come to, wt. 19662 lb. at 35½ marks per ſhippound ?

lb. *m.* *lb.*
280 : 35½ :: 19662 Anſ. 2492 *m.* 14 *ſtiv.*

			m.	*ſ.*
4.	280 lb. of cotton,	at 21 grotes per lb.	183	12
5.	4002¼ lb. coffee,	8¼ ſtivers,	2063	10
6.	2438 pipe ſtaves,	16 marks per ring of 240,	162	9
7.	3540 hhd. ditto,	8½ ditto, ditto,	125	6
8.	529 barrels ditto,	5¼ ditto, ditto,	11	9
9.	1790 lb. ſugar,	21¼ pence per lb.	1188	10
10.	4892 lb. rice,	18¼ marks per 100,	892	12
11.	4 pieces 1.0/4 bedtick,	24 ditto,	96	0
12.	140 half pint tumblers,	8 ditto per 100,	11	3
13.	100 boxes window-glaſs,	23 ditto per box,	2300	
14.	1526½ lb. coffee,	16½ ſtivers per lb.	1574	3
15.	245 bars iron, wt. 8434 lb.	41 marks per ſhippound,	1235	
16.	10 bales hemp, wt. 14108 lb.	74 ditto, ditto,	3728	

17. What is the commiſſion on 18270 marks, at 2½ per cent. ?
Anſ. 456 m. 12 ſt.

18. What is the intereſt of 6370 marks, for three months, at 5 per cent. per annum? Anſ. 79 m. 10 ſt.

19. Change 5955 marks $7\frac{1}{2}$ ſtivers to Dutch florins, at $38\frac{1}{2}$ grot. per florin.

	mar.	*ſt.*	
	5955	$7\frac{1}{2}$	
grotes in a mark =	32	2	grotes a ſtiver.
	11910	15	grotes in $7\frac{1}{2}$ ſtivers.
	17865		
	15		
grotes	$38\frac{1}{2}$	190575	grotes.
	2	2	
	77)	381150 (	4950 marks.
		308	
		731	
		693	
		385	
		385	
		0	Anſ. 4950 gild. or flor.

20. An American merchant orders his correſpondent in Amſterdam to remit 4980 florins $16\frac{1}{2}$ ſtivers to Hamburgh; this being done, when the exchange is $39\frac{1}{4}$ ſtivers for 2 marks, what ſum is he credited for in Hamburgh?

ſt.		*M.*		*F.*	*ſt.*
$39\frac{1}{4}$	:	2	: :	4980	$16\frac{1}{2}$
4				20	
157				99616$\frac{1}{2}$	
				2	
				199233	
				4	
				157)796932(5076 marks	
				785	
				1193	
				1099	
				942	
				942	

Anſ. 5076 marks.

HOLLAND.

Accounts are kept in Florins or Gilders, Stivers, Deniers or Pennings.

8 pennings	make	1 grote.
2 grotes, or 16 pennings		1 ſtiver.
20 ſtivers, or 40 grotes,		1 gilder or florin.

ALSO,

12 grotes, or 6 ſtivers		1 ſhilling.
20 ſhillings, or 6 gilders		1 pound Flemiſh.
2½ florins - -		1 rix dollar.

The florin or gilder of the United Netherlands is eſtimated in the United States at 40 cents.

100 lb. in Amſterdam	make	109½ lb. in the U. States.
100 ells do.	-	75 yards do.

In liquid meaſure, 16 mingles make 1 ſteckan, 8 ſteckans 1 aume.

1. Change 1954 florins to Federal money, at 40 cts. per florin.

1954
40

dols. 781,60 Anſ. 781 dols. 60 cts.

2. Change 2653 gilders 17 ſtivers to Federal money, at 40 cts. per gilder.

2653	17	Or thus, 2653	17
40	2		20
106120	34	53077	ſtiv.
34		2	cts. per ſtiver.
106154	cts.	1061,54	

Anſ. 1061 dols. 54 cts.

3. Change 1061 dols. 54 cts. to gilders, at 40 cts. per gilder.

2)1061,54

2|0)5307|7 ſtivers

2653 17 Anſ. 2653 gild. 17 ſt.

3. What muſt be paid in Boſton for an invoice of goods charged at 591 florins 17 ſtivers; allowing the exchange at 40 cents per florin, or 2 cents per ſtiver, and advancing on it 60 per cent.?

591 17
20

11837 ſtivers.
2

dols. 236,74
60 per cent.

142,0440

	d.	c.
amount of invoice,	236	74
advance,	142	04½
Anſ.	378	78

To change Sterling to Flemiſh.

RULE. As 1 pound ſterling is to the given rate, ſo is the ſterling given to the Flemiſh required.

EXAMPLES.

1. In £.100 10s. ſterling, how many gilders, exchange at 33s.9d. Flemiſh per pound ſterling?

£.	s.	d.	£.	s.
1	33	9	100	10
20	12		20	
20	405 grts.		2010	
			405	
			10050	
			80400	
			2\|0)81405,0	
			2)40702½ grotes.	
			2\|0)2035,1¼ ſtivers.	
			1017 11¼	Anſ. 1017 *gild.* 11¼ *ſtiv.*

To change Flemiſh to Sterling.

RULE. As the given rate is to 1 £. ſterling, ſo is the Flemiſh given to the ſterling required.

EXAMPLE.

1. Change 1017 gilders $11\frac{1}{4}$ ſtivers to ſterling, exchange at 33s. 9d. Flemiſh per £. ſterling.

s.	d.		£.			fl.	ſt.
33	9	:	1	::		1017	$11\frac{1}{4}$
12						40	2
405 grotes.						40680	$22\frac{1}{2}$
						$22\frac{1}{2}$	

405)40702½(100
405
202½
20
405)4050(10
4050
Anſ. £.100 10

To change Current Money to Bank.

RULE. As 100 gilders with the agio added, is to 100 bank, ſo is the current money given to the bank required.

EXAMPLE.

Change 823 gilders, $9\frac{1}{5}$ ſtivers current money into bank, agio at $4\frac{1}{2}$ per cent.

g.		g.		g.	s.
$104\frac{1}{2}$	:	100	::	823	$9\frac{1}{5}$
20				20	
2090				16469	$\frac{1}{5}$
				100	

2090)1646920(788 gilders.

To change bank money into current.

RULE. As 100 gilders bank is to 100 with the agio added, ſo is the bank money given to the current required.

EXAMPLE.

Change 788 gilders bank money to current, agio at $4\frac{1}{2}$ per cent.

g. g. g.
100 : $104\frac{1}{2}$: 788 Anſ. 823 gilders, $9\frac{1}{5}$ ſtiv.

PRACTICAL QUESTIONS.

1. What will 1867 lb. of coffee come to at 19 ſtivers per lb. ?

1867
19
16803
1867
2|0)35547|3 ſtivers.
1773 13 Anſ. 1773 gilders, 13 ſtiv.

2. What will 92 hhds. of ſugar come to, weighing 104242 lb. groſs, deducting 2 per cent. for good weight, tare 18 per cent. at 21 grotes per lb. ?

104242
deduct 2 per cent. 2085
102157
tare 18 per cent. 18388
83769 nt. wt.
21
83769
167538
2)1759149 grotes.
2|0)87957|4½ ſtivers.
43978 14½
Anſ. 43978 gilders 14½ ſtivers.

3. What will 251 bars of iron come to, weighing groſs 10364 lb. at 9¼ gilders per 100 lb. deducting 2 per cent. ?

10364
9¼
93276
5182
2591
1010,49
20
9,80
16
12,80

	£.	s.	p.
2 pr. ct. = 1/50)1010	9	12	
	20	4	3
Anſ.	990	5	9

4. What will 143 ſteckans 2 mingles of brandy come to, at 42 gilders per aume?

8)143

17 7 2

42

34

68

4 ſteckans	½	21		
2	¼	10	10	
1	⅛	5	5	
2 mingles	⅛	0	13	2
		751	8	2

Anſ. 751 gilders 8 ſtiv. 2 penningſ.

				gild.	*ſt.*
5.	21315 lb. of ſugar		23 grotes per lb.	12256	2
6.	56560 -	-	25 -	35350	
7.	27093 -	-	25½ -	17271	15
8.	8189 lb. coffee	-	23½ ſtivers	9622	1
9.	4650 -	-	23¼ -	5405	12
10.	1970 -	-	19¼ -	1945	7
11.	39285 -	-	21¼ -	41740	6
12.	212 ells linen, 208 payable		30 -	312	
13.	4190 lb. butter	-	13 gild. per 40 lb.	1361	15
14.	6476 -	-	11½ -	1861	17
15.	2012 lb. lead	-	13½ do. per 100 lb.	271	12
16.	214 ſteck. 11 ming. brandy		42 do. per aume	1127	2

DENMARK.

Accounts are kept in Daniſh current or rix dollars and ſkillings, reckoning 96 ſkillings to the dollar.

The courſe of exchange on London in September, 1799, was 5 rix or Daniſh dollars for 1 pound ſterling.

The rix dollar of Denmark is eſtimated at 100 cents—(ſee Laws of the United States.)

96 pounds of Denmark make 100 pounds in the United States.

Their weights are ſhippounds, liſpounds and pounds—

16 pounds	make	1 liſpound.
20 liſpounds, or 320 pounds,		1 ſhippound.

1. How much will 8 pieces of platillas come to, at 9 dols. 56 ſkills. per piece ?

9 56
8

76 64 Anſ. 76 dols. 64 ſkills.

2. How much will 1418 bars of iron come to, weighing 263 ſhippounds 9 liſpounds and 4 pounds, at 15 dollars per ſhippound ?

lb. *d.* *s.* *lis.* *lb.*
320 : 15 :: 263 9 4
20

5269
16

31618
5269

84308
15

32|0)126462|0(3951
96

304
288

166
160

62
32

30
96

32)2880(90
2880

Or,

lb.
263
15

lis.
5 ¼ 3945
4 ⅕ 3 72
4*lb.* 1/16 0 00
0 18

Anſ. 3951 90

Anſ. 3951 dols. 90 ſk.

3. What is the commiſſion on 21545 Daniſh dollars, 13 ſkillings, at 2 per cent. ?

21545 13
2

430,90 26
96

566
810

86,66 Anſ. 430 dols. 86 ſkillings.

4. What will 4 hhds. of ſugar come to weighing groſs 4314 lb. tare 17 per cent. at 22 ſkillings per lb. ?

Anſ. 820 dols. 62 ſkills.

					dols.	*ſks.*	*dols.*	*ſks.*
5.	4	pieces table cloth	-		3	80	15	32
6.	50	-	-		9	56	479	16
7.	13	-	-		17	64	229	64
8.	24	-	-		12		288	00
9.	50	-	-		15		750	00
10.	100	coils of cord. wt. 62*ſh.* 16*lis.* 2*lb.*			30	per ſhip'd.	1884	18
11.	85	bun. clean hemp	250		36		9000	00
12.	1951	bars Ruſſi. iron	362	8 10	14		5074	3

13. How many Daniſh dollars will be received in Copenhagen, for a bill of £.2300 on London, exchange at 5 rix dollars per pound ſterling ? Anſ. 11500 dols.

14. A bill is drawn in Copenhagen for 18574 marks, 7 ſtivers Hamburgh money, when the exchange is 128 Daniſh dollars for 100 rix dollars in Hamburgh, how many Daniſh dollars does it amount to ?

NOTE. Three marks are equal to one rix dollar.

	m.	*r.d.*		*m.*	*ſt.*	*r.d.*	*ſk.*
If	3	1	: :	18574	7 :	6191	46

	r.d.	*D.d.*		*r.d.*	*ſk.*		
If	100	128	: :	6191	46	Anſ. 7925 Daniſh dols.	6 ſks.

Or thus,

3)18574 7 Hamb. money.

6191 46

28 per cent. 1733 56

7925 6 Dan. money. as above.

B R E M E N.

Accounts are kept in rix dollars and grotes, reckoning 72 grotes to the rix dollar, which is equal to 2¼ marks.

On the 29th Nov. 1795, the exchange on London was 551 rix dollars for £.100 ſterling.

100 lb. in Bremen are equal to 110 lb. in the United States.

1. What will 1104 lb. of coffee come to at $32\frac{1}{4}$ grotes per lb.?

1104
$32\frac{1}{4}$
2208
3312
552
276
r. d. grotes.
72)36156(502 12
360
156
144
12

2. What is the commiſſion on 7261 rix dollars 6 grotes, at $8\frac{1}{2}$ per cent.? Anſ. 266 rix dols. 53 grotes.

				r. dol.	gr.
3.	3071 lb. coffee	$32\frac{3}{4}$ grotes per lb.		1396	63
4.	400 -	$32\frac{1}{4}$ -		181	18
5.	706 -	$33\frac{1}{2}$ -		328	35
6.	31407 lb. ſugar	$15\frac{3}{4}$ -		6870	20

RUSSIA.

Accounts are kept in Peterſburgh, in Rubles and Copecs, reckoning 100 copecs to 1 ruble.

The courſe of exchange on London, in July, 1796, was $31\frac{1}{4}d.$ ſterling per ruble.

Ditto - on Amſterdam - 30 ſtivers banco per ruble.
Ditto - on Hamburgh, Aug. 1798, $22\frac{1}{2}$ ſtiv. banco do.

100 lb. Peterſburgh weight are equal to $88\frac{3}{4}$ lb. in the U. States.

Their weights are Barquits, Poods, Pounds, and Zollotnicks—

96 zollotnicks	- make	-	1 pound.
40 pounds	- -	-	1 pood.
10 poods	- -	-	1 barquit.

Their long meaſure is the Arſheen, of 28 American inches: nine arſheens are equal to ſeven yards.

1. What will 7500 arſheens of ravens-duck come to, at $14\frac{1}{2}$ rubles for 50 arſheens?

arſh.		*rub.*		*arſh.*	
50	:	$14\frac{1}{2}$	::	7500	Anſ. 2175 rubles.

2. What will 813 poods 5 lb. of clean hemp come to, at $30\frac{1}{2}$ rubles per barquit?

lb.		*rub.*		*p.*	*lb.*
400	:	$30\frac{1}{2}$	::	813	5

40

32525

$30\frac{1}{2}$

975750

16262

4|00)9920|12

2480,03

Anſ. 2480 rubles 3 copecs.

3. What will 2846 poods 5 lb. of bar iron come to, at 200 copecs per pood?

2846

200

569200

5 lb. $\frac{1}{8}$ 25

copecs 569225 Anſ. 5692 rub. 25 cop.

4. What is the commiſſion on 5256 rubles 33 copecs, at 3 per ct.?

5256,33

3

157,68,99 Anſ. 157 rubles 68 copecs.

				rub.	*cop.*
5.	$4997\frac{1}{2}$ arſheens flems.	24 rub. per 50 arſh.		2398	80
6.	1700 do. drillings	34 copecs per arſh.		578	
7.	355 do. ticking	100 do.	do.	355	
8.	$118\frac{1}{4}$ do. do.	110 do.	do.	130	62
9.	200 pieces of ſail cloth	21 rub. per piece		4200	
10.	2101 poods 25 lb. of hemp	31 do. per barquit		6515	04

11. How many rubles muſt be received in Peterſburgh for a bill of 15500 gilders on Amſterdam, when the exchange is 30 ſtivers per ruble?

St.		*Cop.*		*Gild.*
As 30	:	100	: :	15500

20

310000 ſtivers

100

3|0)3100000|0

10333,33$\frac{1}{3}$

Or thus, $\frac{1}{3}$)15500

5166,66$\frac{2}{3}$

10333,33$\frac{1}{3}$

Anſ. 10333 rub. 33$\frac{1}{3}$ cop.

12. A bill of £.3000 Sterling is drawn on London, exchange at 31¼*d.* Sterling per Ruble, what is its value in Peterſburgh?

d.		*rub.*		£.
As 31¼	:	1	: :	3000
4				20
127				60000
				12
				720000
				4

127)2880000(22677 rubles
254
340
254
860
762
980
889
910
889
127)2100(16 copecs
127
830
762 Anſ. 22677 rub. 16 cop.
68

Two cyphers are annexed to the remainder inſtead of multiplying by 100 copecs.

FRANCE.

12 deniers = 1 ſol, 20 ſols = 1 livre.

The crown of exchange is 3 livres tournois.

A livre tournois of France is eſtimated at 18½ cents in the United States.

NOTE. The word *tournois* is applied to the money of France, as ſterling is to the money of England.

1. Change 1220 pounds ſterling to French money, exchange at 17½ livres per crown of 3 livres tournois.

d.	*liv.*	*£.*
17½	: 3 : :	1220
8		20
141		24400
		12
		292800
		8
		2342400
		3

141)7027200(49838 liv.
564
1387
1269
1182
1128
540
423
1170
1128
42
20
141)840(5 s.
705
135
12
141)1620(11 d.
141
210
141
69 Anſ. 49838 liv. 5 ſol. 11 den.

2. Change £400 ſterling to French money, exchange at 17½d ſterling per crown of 3 livres. Anſ. 16225 liv. 7 s. $0\frac{36}{71}$ d.

3. Change 4224 livres tournois to ſterling, exchange at 17½*d.* per crown of 3 livres.

liv.		*d.*		*liv.*
3	:	17½	::	4224

17½

29568
4224
2112

8)739²⁰

12)24640

2|0)205|3 4

102 13 4

Anſ. £.102 13*s.* 4*d.*

Or, Take ⅓ of the given ſum to reduce it to crowns, and multiply by the rate of exchange; the product will be the anſwer in pence.

⅓)4224 livres.

1408 crowns.
17½

9856
1408
704

12)24640 pence.

2|0)205|3 4

£.102 13 4 as above.

4. Change 49838 livres 5*s.* 11²³⁄₄₇*d.* to ſterling, exchange at 17½*d.* ſterling per crown. Anſ. £.1220

5. What will 2434 velts of brandy come to, at 320 livres per 29 velts? Anſ. 26857 liv. 18 s. 7 d.

6. What is the freight of 3302½ velts, at 9 livres per ton of 120 velts? Anſ. 247 liv. 13 s. 9 d.

7. What is the commiſſion on 36591 liv. 2 s. 4 den. at 2½ per cent.? Anſ. 914 liv. 15 s. 6 den.

8. What is the intereſt of 66476 liv. 10 s. 9 den. for 1 mo and 10 days, at ½ per cent. per month?

½)66476 10 9

332|38 5 4
20

7|65
12

7|84

332 7 7
10 days ⅓ 110 15 10

Anſ. *Liv.* 443 3 5

9. What is the intereſt of 3255 livres, for 28 days, at ½ cent. per month?

½)3255

16|27 10
20

5 50
12

6|00

16 5 6 for one month.

15 days ½ 8 2 9
10 ⅓ 5 8 6
3 ⅕ 1 12 6

Anſ. *Liv.* 15 3 9

SPAIN.

SPANISH reckonings are of two ſorts—

Money of plate, diſtinguiſhed *hard* or *plate* dollars, &c.

Money of vellon, diſtinguiſhed by *current* dollars.

The former is $88\frac{4}{17}$ per cent. above the latter.

100 reals plate being equal to $188\frac{4}{17}$ reals vellon.
100 reals vellon - - $53\frac{1}{8}$ do. plate.
17 reals plate - - 32 do. vellon.
17 piaſters or current dollars 256 do. do.

4 maravadies make 1 quarto 21 quartos or 34 maravadies 1 r

The peſo, piaſter, or current dollar of 8 reals plate, paſſes at 15 reals vellon in trade, but in exchange it is eſtimated at 15 reals vellon 2 maravadies.

The ducat of exchange is 375 maravadies.

The real plate, is eſtimated 10 cents, and the real vellon at 5 cents, in the United States.

The Spaniſh arobe, is 25 lb.

100 lb. of Spain is 97 lb. Engliſh.

To change reals vellon to reals plate.

RULE. Multiply the given ſum by 17, and divide by 32 for reals plate.

EXAMPLE.

Change 800 reals vellon to reals plate.

800
17

32)13600(425
128

80
64

160
160

Anſ. 425 reals plate.

To change reals plate to reals vellon.

RULE. Multiply the given ſum by 32, and divide by 17 for reals vellon.

EXAMPLE.

In 425 reals plate, how many reals vellon?

425
32

850
1275

17)13600(800
136

00

Anſ. 800 reals vellon.

To change reals plate and reals vellon, to Federal money.

RULE. Multiply the reals plate by 10, and the reals vellon by 5, for the cents in the given ſum.

EXAMPLES.

1. Change 14958 reals plate, to Federal money.

14958
10

1495,80 Anſ. 1495 dols. 80 cts.

2. Change 17593 reals vellon, to Federal money.

17593
5

879,65 Anſ. 879 dols. 65 cts.

CADIZ.

Accounts are kept by ſome in hard or plate Dollars, Reals Vellon, and Quartos.

8½ quartos	make		1 real vellon.
20 reals vellon	-	-	1 dollar of plate.

Others keep their accounts in Reals Plate and Maravadies, reckoning 34 maravadies to 1 real plate.

To bring reals plate to dollars.

RULE. Multiply the given ſum by 32, and divide by 17 for reals vellon, and divide the reals vellon by 20 for dollars.

EXAMPLE.

In 320 reals plate how many hard dollars?

320
32

640
960

17)10240(602 reals vellon.
102

40
34

6
8½ 20)60|2 reals vellon.

17)51(3 quartos. dol. 30 2 3
51

Anſ. 30 dol. 2 r.v. 3 q.

To change hard dollars to reals plate.

RULE. Multiply the dollars by 20 for reals vellon, and the reals vellon being multiplied by 17 and divided by 32 give the reals plate required :— Or, Multiply the dollars by $10\frac{5}{8}$ for reals plate.

EXAMPLES.

1. In 16 hard dollars, how many reals plate?

16
20
320
17
2240
320
32)5440(170
32
224
224
0

Or thus, 16 × $10\frac{5}{8}$ = 160 + 10 = 170 *R. P.*

16 × 5 = 80 ÷ 8 = 10

Anſ. 170 reals plate.

2. 250 quintals of fiſh at 4 hard dollars per quintal, what is the amount in reals plate?

250
4
1000
20
20000
17
32)340000(10625
32
200
192
80
64
160
160

Anſ. 10625 reals plate.

PRACTICAL QUESTIONS,

The anſwers to which are in dollars, reals vellon, and quar

1. What will 45940 pipe ſtaves come to at 80 piaſtres o rent dollars per M. or 1200 ?

45940
80

12|00)3675a|00

3062⅔ current dols.
8 reals.

24501⅓ reals plate.
32

49002
73503
10⅔

17)784042⅔(46120
68

104
102

20
17

34
34

2⅔
8½

17)22⅔(1
17

5⅔

2,0)4612,0

dols. 2306 o 1

Anſ. 2306 h.dol. o r.

		D.
2.	21800 barrel ſtaves at 30½ piaſtres per 1200	417
3.	1200 Hhd. do. 40 do. do.	80
4.	2 caſks cherry wine 30 do. per caſk	45

The result of the following is in rials plate, and maravadies.

5. In 610 hard dollars, how many rials plate.

610
20 rials vellon = 1 hard dollar

12200
17

85400
12200

32)207400(6481
192

154
128

260
256

40
32

8 Anſ. 6481 r.p. 8 mar.

6. What will 2632 barrels of flour come to, at 11 current dollars per barrel?

2632
11

28952 piaſtres or current dollars
8 rials plate = 1 piaſt. or current dollar

Anſ. 231616 rials plate.

7. 88 laſts of white dry ſalt, at 6 piaſtres per laſt.

88
6

528
8

4224 Anſ. 4224 rials plate.

8. Change £.600 ſterling to rials plate, exchange at 36¼d. ſterling per piaſtre.

600
20
12000
12
144000
4
576000
145) 576000 (3972 current dollars.
435
1410
1305
1050
1015
350
290
60
8
145)480(3 rials
435
45
34
180
135
145)1530(10 maravadies
145
80

8
31776
3 10
31779 10

Anſ. 31779 rials plate 10 m

9. In £.3200 Sterling, how many rials plate, exchange at 36 Sterling per piaſtre? Anſ. 169489 r. plate 22 ma

N. B. In ST. LUCAR accounts are kept in Rials plate Quartos, 16 quartos to 1 rial plate.

BILBOA.

Accounts are kept in Rials vellon and Maravadies, 34 maravadies making 1 rial.

To change piaſtres or current dollars to rials plate.

RULE. As 1 current dollar is to 15 rials 2 maravadies, ſo is the given ſum to the rials required; or, multiply the ſum by 15 rials 2 maravadies, for rials.

EXAMPLE.

In 5000 current dollars, how many rials vellon?

$2 = \frac{1}{17}$)5000
15 2 = 1 c.dol.

25000
5000
294 4

75294 4

Or thus, 5000
2

34)10000

294 4

Anſ. 75294 r. vel. 4 mar.

To change current dollars to ſterling.

RULE. As 1 dollar is to the rate of exchange, ſo is the given ſum to the ſterling required.

EXAMPLE.

In 5000 piaſtres or current dollars, how many pounds ſterling, exchange at $36\frac{3}{8}$*d.* per dollar?

p.		*d.*		*p.*
As 1	:	$36\frac{3}{8}$	::	5000

$36\frac{3}{8}$

180000
1875

12)181875

2|0)151516 3

Anſ. £.757 16 3

5000
3

8)15000

1875

To change ſterling to current dollars.

RULE. As the rate of exchange is to 1 dollar, ſo is the given ſum to the dollars required.

EXAMPLE.

In £.757 16 3 ſterling, how many current dollars, exchange at 36¾d. ſterling per dollar?

	d.		dol.		£.	s.	d.	
As	36¾	:	1	::	757	16	3	Anſ. 5000 cur.dols. or piaſt.

To change ſterling to rials vellon.

RULE. As the rate of exchange is to 15 rials 2 maravadies, ſo is the given ſum to the rials required.

EXAMPLE.

In £.436 10s. ſterling, how many rials vellon, exchange at 36¾d. ſterling per current dollar?

	d.		r. m.		£.	s.
As	36¾	:	15 2	::	436	10

8 — 20

291 — 8730

12

104760

8

2 marav. = 1/17 — 838080

15 2

4190400

838080

49298

291)12620498(43369

1164

980

873

1074

873

2019

1746

2738

2619

119

34 mar. = 1 rial.

291)4046(13

Or, 838080 / 2 = 34)1676160 mar. = 49298 rials.

Anſ. 43369 rials 13 mar.

PRACTICAL QUESTIONS.

1. What will 122 quintals of fiſh come to, at 136 rials per quintal?

122
136

732
366
122

Anſ. 16592 rials.

2. What is the cranage of 1137 quintals of fiſh, at 10 maravedies per quintal? Anſ. 334 *R.* 14 *M.*

PORTUGAL

Accounts are kept in Millreas and Reas, reckoning 100 reas to 1 millrea of 5*s.* 7½*d.* Sterling, or 1 dol. 25 cts. in the United States.

A vinten is 20 reas, and 5 vintens is a feſtoon of 100 reas.

1. Change 579 millreas 740 reas to Federal, at 1 dol. 25 cts. per millrea.

		M.	*R.*
579·740	Or thus,	579,740	
1,25	¼ added	144,935	
2898 700	dollars	724,675	
69568 80			
cents 72467,500			

Anſ. 724 dols. 67½ cts.

2. Change 724 dols. 67½ cts. to millreas, at 1 dol. 25 cts. per millrea.

1,25)724,675(579 mill. 740 reas.

Or, deducting ⅕ from the ſum in Federal money gives the millreas, &c.

Example. ⅕)724,675
144,935

579·740 as before.

3. Change 579 millreas 750 reas to Sterling, at 5*s.* 7½*d.* per millrea.

579,750
67½
4058,250
34785,00
289,875
12)39133,125
2|0)326|1 1
Anſ. £.163 1 1⅛

4. In £.163 1 1⅛ ſterling, how many millreas, at 5*s.* 7½*d.* per millrea?

s.	*d.*		£.		£.	*s.*	*d.*
5	7½	:	1000	: :	163	1	1⅛

Anſ. 579 mill. 750 reas.

5. What is the commiſſion on 6245 mill. 46 reas, at 2½ per cent.?

6245,046
2½ per 1,00
12490092
3122523
156,12615 Anſ. 156 mill. 126 reas.

6. Suppoſe a cargo is ſold for 6245 millreas, at two months credit, for prompt payment of which ½ per cent. per month is allowed; how much is the diſcount?

½)6245
31,225 for 1 month
2
Anſ. 62,450 for 2 months

Or thus,
½ per cent. for 2 months=1 per cent.
6245
1
62,45

7. Suppoſe you import 5960 hogſhead ſtaves and 5060 barrel ſtaves, on which there is a duty of 23 per cent. which is taken in kind, how many of each remain for ſale?

Anſ. 4590 hhd. and 3897 bbl.

		M. R.	*M. R.*
8.	702 barrels of flour at	8,600 per bbl.	6037,200
9.	4590 hhd. ſtaves	,030 per ſtave	137,700
10.	3897 bbl. do.	,020 per do.	77,940
11.	71 alquiers of beans	,480 per alquier	34,080

Measures of Portugal.

Cloth Meaſure.

A vara is $43\frac{1}{8}$ inches Engliſh.
A covedo is $26\frac{2}{3}$ ditto.

Wine Meaſure.

1 almude is 12 canados.
1 canado is 4 quarteels.
An almude is $4\frac{1}{2}$ gallons, Engliſh wine meaſure.
A canado is 3 pints Engliſh.

Corn Meaſure.

1 moy is 15 fangas.
1 fanga is 4 alquiers.
1 moy of 60 alquiers is 3 Engliſh quarters, or 24 buſhels, Wincheſter meaſure.
1 quarter is 20 Alquiers.
1 Engliſh buſhel is $2\frac{1}{2}$ alquiers in Liſbon, 2 alquiers in Oporto, and $2\frac{3}{8}$ alquiers in Figuiras.
A moy of ſalt is the ſame meaſure as corn.
A pipe of coals is 16 fangas.
1 fanga is 8 alquiers.
A pipe of coals is 128 alquiers, which at $2\frac{1}{2}$ alquiers per buſhel, is $51\frac{1}{2}$ buſhels Engliſh.

Weights of Portugal.

1 quintal is 4 arobes.
1 arobe is 32 pounds, ſo that a quintal is 128 lb. Portugal weight, which is equal to about 132 lb. Engliſh, avoirdupois weight.
A pound is about $16\frac{1}{2}$ ounces Engliſh.

Loss *by exchanging Engliſh money in Portugal.*

An Engliſh guinea paſſes at Liſbon for 3 m. 600 r. which is 134 reas, or 9 pence leſs than the value.
An Engliſh crown paſſes for 800 reas, which is 89 reas, or 6 pence, leſs than the value.
An Engliſh ſhilling paſſes for 160 reas, which is 18 reas, or about $1\frac{1}{4}$ penny, leſs than the value.

LEGHORN.

Accounts are kept in Piaſtres, Soldi, and Denari, reckoning 12 deniers to 1 ſoldi, and 20 ſoldi to 1 piaſtre or dollar of 48*d.* ſterling at par.

1¼	paul, or a ſols,	are equal to	1 livre.
6	livres -	-	1 piaſtre or dollar.
5¼	livres (effective money)		1 do.
1	ducat -	-	1⅛ do.

Weights—A pound is only 12 ounces in all commodities.

145 lb. is ſaid to be equal to the Engliſh quintal of 112 lb.; fiſh generally renders about 136 to 138 lb. per quintal.

145 lb. in Leghorn		make	112 lb. in the U. States
4 braſſes	-	-	1 cane.
100 braſſes	-	-	64 yards, U. States.
1 palm	-	-	9¼ inches, do.

4 ſacks are 2 per cent. leſs than an Engliſh quarter, of 8 buſhe

1. How much will 5630 lb. of ginger come to, at 9 piaſ per 100?

5630
9

506|70
20

14|00 Anſ. 506 piaſt. 14 ſo

2. What will 9760 lb. of pepper come to, at 27¼ ducats 100?

9760
27¼

68320
19520
2440

¼)265960
44326¾

piaſt. 3102|86¾
20

ſoldi 17|33⅓
12

den. 4|00 Anſ. 3102 piaſt. 17 ſol. 4 d

3. What will 143700 lb. of pitch come to, at 26 pauls per 100?

NOTE. 1 paul is equal to $\frac{2}{3}$ of a livre.

143700
26
862200
287400
37362,00 pauls.
2
3)74724
6)24908 livres.
4151 6 8

Anſ. 4151 piaſt. 6 ſol. 8 den.

4. How much will 4200 ſacks of wheat come to, at 26 livres, effective money, per ſack?

4200
26
25200
8400
109200 livres.

liv. *piaſt.*
$5\frac{1}{4}$: 1 :: 109200

Anſ. 18991 piaſt. 6 ſols. 1 den.

			piaſt.	*s.*	*d.*
5.	100 barrels pork	16 piaſt. per lb. -	1600	0	0
6.	1000 do. flour	$10\frac{1}{2}$ do. -	10500	0	0
7.	2660 lb. coffee	26 do. per 100 -	691	12	0
8.	6578 lb. pimento	18 do. do. -	1184	0	9
9.	9370 lb. rice -	24 liv.cur.money pr.100,	374	16	0
10.	97270 lb. logwood	16 piaſt. per 1000 -	1556	6	4
11.	4170 lb. Ruſſia wax	$33\frac{1}{3}$ ducats per 100	1629	15	6
12.	104060 lb. ſugar	30 piaſt. per 151 lb.	20674	3	5
13.	3350 lb. loaf-ſugar	30 do. per 100	1005	0	0
14.	1000 caſks tar	$4\frac{1}{2}$ do. per caſk -	4500	0	0
15.	100000 ſtaves	4 do. per 100 -	4000	0	0

NAPLES.

Accounts are kept in Ducats and Grains, reckoning 100 grains to 1 ducat.

The current coins are grains, carlins, ducats, dollars, and ounces.

10 grains make 1 carlin; 10 carlins 1 ducat; 3 ducats 1 ounce.

The Naples dollar paſſes for 110 grains, and the Spaniſh dollar for 111 grains.

100 lb. Naples weight are equal to 64½ lb. Engliſh.

Brandy is ſold per cask of 12 barrels, or 132 gallons; 60 karafts make a barrel.

Serving tiles are ſold per lb. of 12 ounces.

Lathing is ſold per cord of 84 inches.

Sugar, coffee, ſpices, and tobacco are ſold per cantar, of 196 lb. in the Levant States.

The cantar is ſubdivided into 100 rotolis of 33 ounces each.

1. What is the amount of 12 casks 6 barrels 29 karafts of brandy, at 52 ducats per cask?

			52
			12
			624
6 bbl.	½		45
29 kar.	1/11		2 55
5 do.	1/12		64 marcelli
4 do.	1/15		51
		duc.	969 70

Anſ. 969 ducats 70 grains.

2. What is the amount of 2 casks of clayed ſugar, weighing net 10 cantars 51 rotolas, at 65 ducats per cantar?

cant.	duc.		rot.	
100	: 65	: :	1051	
			65	
			5255	
			6306	
		duc.	683,15	

Or thus,

		65
		10
		650
50 rot.	½	32 50
1 do.	1/33	65
	duc.	683 15

Anſ. 683 ducats 15 grains.

3. How much is the amount of 1 box of ſcented ſoap, containing 100 parcels of 16 ounces each, at 22 grains per rotola?

			100	
			16	
oz.	gr.			
33	: 22	: :	1600 oz.	: Anſ. 10 ducats 66 grains.

4. What is the commiſſion on 996 ducats, at 2 per cent.?

Anſ. 19 ducats 92 grains.

	can. rot.		*ducats.*	*duc. gr.*
5.	3 73	of coffee -	73 per cantar	272 29
6.	16 19¼	ſoap -	21 -	340 14
7.	1 59	do. -	21 -	33 39
8.	7 97¼	do. -	21 -	167 52
9.	67½	ſcented ditto -	30 -	20 25
10.	52	white ditto -	17 -	8 84
11.	7 64	raiſins -	12 -	91 68
12.	2 caſks 11 bbls. 4 karafts of brandy		102 per caſk	298 06
13.	10 do. 43 do.	ditto	92 do.	82 16
14.	9 do. 12 do.	ditto	92 do.	70 53
15.	355 canes of ſilk -	-	2 50 per cane	887 50

SMYRNA.

Accounts are kept in piaſtres and hundredths, except the Engliſh accounts, which from ancient cuſtom are kept in piaſtres and eightieths or half paras.

The fractional parts are ſometimes called aſpers, 100 aſpers to 1 piaſtre.

The following calculations are made in piaſtres and hundredths.

A piaſtre is equal to 40 paras, and a Spaniſh dollar to 136 paras.

340 piaſtres are equal to 100 Spaniſh dollars.

The exchange on London was 13 piaſtres for 1 pound ſterling, May 14th, 1800.

Their weights are the Rotola, Oke, Cheque, and Tiffee—

A rotola -	marked *Ro.*	is	180 drams.
An oke - -	%	is	400 do.
A cheque of opium -	-	is	250 do.
do. of goat's wool -		is	800 do. or 2 okes.
A tiffee of ſilk -	-	is	610 do.

100 rotolas, or 1800 drams, or 45 okes, are a quintal of this country.
112 lb. Engliſh ſhould render here 40¾ okes, or 90⅔ rotolas.
45 okes of this country render 123¾ lb. Engliſh.
A pike is 27 inches nearly.

To change piaſtres to dollars.

Rule. Multiply the piaſtres by 5, and divide the product by 17, for cents.

EXAMPLE.

Change $1277\frac{55}{100}$ piaſtres to dollars.

1277,55
5

17)6387,75(375,75
51

128
119

97
85

127
119

85
85

Anſ. 375 dols. 75 cts.

To change dollars to piaſtres.

RULE. Multiply the dollars by $3\frac{2}{5}$ for piaſtres.

EXAMPLE.

Change 375 dols. 75 cts. to piaſtres.

375,75
$3\frac{2}{5}$

1127,25
75,15 } for $\frac{2}{5}$
75,15 }

Anſ. piaſt. 1277,55

PRACTICAL QUESTIONS.

1. How much will 10 ſerons of cochineal come to, weig neat 724 okes 73 rotolas, at 80 piaſtres per oke?

724,73
80

Anſ. piaſt. 57978,40

2. 299 bags of ſugar, weighing 506 quintals 96 rotolas, tare 14 rotolas per bag, at 110 piaſtres per quintal.

groſs	506 96		299
tare	41 86		14
neat	465 10		1196
	110		299
Anſ. piaſt.	51161 00		100)4186
			41 86

3. 4 caſes of opium, weighing groſs 1026 rotolas, tare 84 okes 75 rotolas, at $10\frac{3}{4}$ piaſtres per cheque.

NOTE. 1 rotola is equal to $\frac{9}{20}$ of an oke, and 1 oke to $1\frac{3}{5}$ cheques.

rot.	1026	
	9	
	20)9234 rot.	
groſs okes	461 70	
tare	84 75	
neat okes	376 95	376 95
	$1\frac{3}{5}$	3
	376 95	5)1130 85
	226 17	226 17
cheques	603 12	
	$10\frac{3}{4}$	
	6031 20	
	301 56	
	150 78	
Anſ. piaſt.	6483 54	

4. 893 pieces of copper, neat okes 19743,85, at $\frac{70}{400}$ or 70 paras per oke.

	O. R.
	19743,85
	70
	400)1382069500
Anſ. piaſt.	34551,73

5. What is the cuſtom-houſe duty on 19740 okes of copper, agio $2\frac{1}{2}$ per cent.?

Note. The charges are all eſtabliſhed by a tariff of the L Company.

19740
$2\frac{1}{2}$

39480
9870

493500

agio $2\frac{1}{2} = \frac{1}{40}$ 1233,75 amount of duty at $2\frac{1}{2}$ pa
30,84 agio at $2\frac{1}{2}$ per cent.

Anſ. piaſt. 1264,59

6. Engliſh conſulage on 430 quintals, at $5\frac{1}{2}$ piaſt. agio 7 cent.?

430
$5\frac{1}{2}$

2150
215

2365
7

Anſ. piaſt. 165,55

7. Cuſtom-houſe duties on 88 quintals 90 rotolas, at $\frac{20}{110}$, $2\frac{1}{2}$ per cent.

88,90
20

110)1778,0

$2\frac{1}{2} = \frac{1}{40}$)16,16
,40

Anſ. piaſt. 16,56

8. What will the following charges amount to, viz. porterage $\frac{8}{100}$, houſe porters $\frac{4}{100}$, weighing $\frac{2}{100}$, chan duty $\frac{2}{100}$, viſiting and marketing $\frac{1}{100}$ per quintal on 438 quintals?

porterage	8	438
houſe porters	4	17
weighing	2	
chan duty	2	4\|0)744\|6
viſiting	1	
	17	Anſ. piaſt. 186,15

ENGLISH WEST-INDIES.

Accounts are kept in Pounds, Shillings, and Pence.

JAMAICA AND *BERMUDAS.*

The Spaniſh dollar paſſes at 6*s.* 8*d.* three dollars are equal to 20 ſhillings, or 1 pound, Jamaica currency.

To change Jamaica currency to Federal.

RULE. Multiply the pounds by 3 for dollars. If there be ſhillings, &c. increaſe the pence in the given ſum by $\frac{1}{4}$ for cents.

EXAMPLES.

1. When lumber is ſold in Jamaica at £.15 per M. how much is it in Federal money?

15
3

Anſ. 45 dollars.

2. Change £.54 12*s.* 11*d.* Jamaica currency to Federal.

54 12 11
20

1092
12

$\frac{1}{4}$)13115
3278$\frac{1}{4}$

163,93$\frac{1}{4}$ cts. Anſ. 163 dols. 93$\frac{1}{4}$ cents.

3. What will 102,896 feet of boards come to, at £.15 per

102,896
15
514480
102896
£.1543:440
20
s. 8,800
12
d. 9,600 Anſ. £.1543 8

4. What will 5 hhd. of ſugar come to, weighing 8519 lb. at 70 ſhillings per 100 lb. ?

8519
70
2|0)596|3.30
Anſ. £.298 3 3

5. How much will 5 hhd. of ſugar come to, weighing 910 neat, at 75 ſhillings per 100 ?

9103
75
45515
63721
2|0)682|7,25
Anſ. £.341 7 3

BARBADOES.

The Spaniſh dollar is 6*s.* 3*d.* Barbadoes currency.

To change Barbadoes currency to Federal.

RULE. Increaſe the pence in the given ſum by one-thir cents.

EXAMPLE.

Change £.49 11 10 Barbadoes money to Federal.

		Proof $\frac{1}{4}$)15869$\frac{1}{3}$ cts.
£.49 11 10		3967$\frac{1}{3}$
20		
991		12)11902 pence
12		20)99,1 10
$\frac{1}{3}$)11902		£.49 11 10
3967$\frac{1}{3}$		
158.69$\frac{1}{3}$	Anſ. 158 dols. 69$\frac{1}{3}$ cts.	

Other calculations as in Jamaica.

MARTINICO, TOBAGO, AND *ST. CHRISTOPHER'S.*

Theſe iſlands being inhabited by French and Engliſh, the former keep their accounts in Livres, Sols, and Deniers, and the latter in Pounds, Shillings, and Pence.

A *current* dollar	is	8*s.* 3*d.*
A *round* dollar	paſſes for -	9*s.*

When payment of freight or goods is mentioned in Spaniſh dollars, diſagreement reſpecting their value has frequently ariſen; and to prevent it, ſome perſons diſtinguiſh them by round and current dollars; others mention the *bits* to each. But the moſt certain way is to ſpecify the number of ſhillings or livres, inſtead of dollars; thus A ſells to B a barrel of flour, at 99 ſhillings or livres; in payment B may allow him 11 dollars at 9 ſhillings each, or 12 dollars at 8*s.* 3*d.* each, either being equal to 99 ſhillings or livres, the ſum ſpecified by their agreement.

FRENCH WEST-INDIES.

Accounts are kept in Livres, Sols, and Deniers.

12 deniers make 1 ſol, and 20 ſols 1 livre.

The Spaniſh dollar paſſes in ſome places for 8 livres 5 ſols, and in others for 9 livres.

1 cwt. or 112 lb. in the United States is equal to 104 lb. French.

100 lb. French are equal to 108 lb. nearly, in the United States.

When any commodity is to be marked in French weight 4 per cent. is added to the neat hundreds; thus a hogſhead of fiſh weighing neat 10 cwt. is marked 1040 lb. Fiſh ſhipped from the United States will anſwer to the weight thus marked, provided it comes out in good order, and the *caſk* weighs exactly the cuſtomary tare, which is 10 per cent.

100 lb. of coffee or cotton, bought in the French iſlands, will, or ought to weigh 108 lb. (it will often weigh 110 lb.) in the United States; and as theſe articles are ſold here per lb. there is a gain of 8 to 10 per cent. in the weight. But on ſugar, which is bought for 100 lb. and ſold here per 112. there is a loſs of 6 per cent. becauſe there is 4 per cent. between the American cwt. and 100 lb. French, and 2 per cent. difference in the tare. The tare on brown ſugar in the French iſlands being 10 per cent. and the American tare 12 per cwt. The loſs on clayed ſugar is greater, occaſioned by the cuſtomary tare, which is but 7 per cent. in the French iſlands, whereas it is here 12 per cent. the ſame as on brown ſugar.

NOTE. The tare allowed on ſugar among merchants is 12 per 112; that allowed by the cuſtom-houſe is 12 per 100. [See Tare and Tret.]

1. Change 10692 livres to dollars, at 8¼ livres per dollar.

8¼ 10692
4 4

33) 42768 (1296
33

97
66

316
297

198
198

Anſ. 1296 dollars.

2. Change 7713 livres to dollars, at 9 livres per dollar.

9)7713

Anſ. 857 dollars.

3. In 1296 dollars, at 8¼ livres each, how many livres?

1296
8¼

10368
324

Anſ. 10692 livres.

4. 857 dollars, at 9 livres each, how many livres?

857
9
Anſ. 7713 livres.

5. What will 1642 lb. of coffee come to at 15 ſols per lb.

1642
15
8210
1642
2|0)2463|0 ſols.
livres 1231 10 Anſ. 1231 liv. 10 ſols.

6. 1780 lb. cotton at 157 livres 10 ſols per 100 lb.

1780
157
12460
8900
1780
10 ſols ½ 890
liv. 2803|50
20
ſols 10|00 Anſ. 2803 liv. 10 ſols.

7. 24 barrels of beef at 101 liv. 1 ſol 3 deniers per barrel.

liv.	*s.*	*d.*
101	1	3
		6
606	7	6
		4
2425	10	0

Anſ. 2425 liv. 10 ſols.

8. How many dollars, at 8 livres 5 ſols. per dollar, will pay for 12 hhd. of brown ſugar, weighing 13365 lb. at 40 livres per 100 lb.

13365
40

$8\frac{1}{4}$ 53;6.00
4 4

33 21384 . 648 dollars.
193

138
132

264
264

9. A cargo, amounting to 12536 dollars in the United States, is ſold at $12\frac{1}{2}$ per cent. advance on the invoice; how many livres will it amount to, eſtimating the dollar at $8\frac{1}{4}$ livres each.

$12\frac{1}{2}=\frac{1}{8}$) 12536 invoice.
1567 advance.

14103 amount.
8

112824 livres at 8 per dollar.
5 ſols $\frac{1}{4}$ $35^{25}\frac{1}{4}$

Anſ. $116349\frac{1}{4}$ livres at $8\frac{1}{4}$ per dollar.

					ſols	*d.*		*liv.*	*s. d.*
10.	6 hhd. coffee	weighing	4471	lb. at	14	6	per lb.	3241	9 6
11.	14 do. ſugar	do.	16477		38	*liv.*	per 100,	6261	5 2
12.	1 bale of cotton	do.	227		150		ditto	340	10 0
13.	94 hhd. fiſh	do.	101313		33		ditto	33433	5 9
14.	16 caſks of rice	do.	6575		40	10	ditto	2662	17 6
15.	1390 hoops	-	-		480		per M.	667	4 0
16.	15059 feet of boards		-		100		ditto	1505	18 0
17.	48 ſhaken hhd. with heads				7	15	per hhd.	372	0 0
18.	29 barrels of beef	-			90	15	per bbl.	2631	15 0
19.	6759 velts of molaſſes		-			26	per velt	8786	14 0
20.	32670 gals. do. at 73 l. 7 ſ. 9 d.				per tierce of 60 gals.			39959	9 10

SPANISH WEST-INDIES:

Accounts are kept in Havannah, Laguira, Vera Cruz, &c. in dollars and rials, reckoning 8 rials to a dollar.

The Spaniſh arobe is 25 lb.

1. What will 123 pieces Bretagnes come to, at 26 rials per piece?

123
26

738
246

8)3198

399 6 Anſ. 399 dols. 6 rials.

2. 21784 feet boards, at 45 dollars per thouſand.

21784
45 per M.

108920
87136

980,280
8

2,240 Anſ. 980 dols. 2 rials.

3. 153 caſes gin, at $8\frac{5}{8}$ dollars per caſe.

153
$8\frac{5}{8}$

1224
4 rials 76 4
2 do. 38 2

1338 6 Anſ. 1338 dols. 6 rials.

4. What is the commiſſion on 14792 dollars 5 rials, at 4 per cent.?

14792 5
4

591|70 4
8

5|64 Anſ. 591 dols. 5 rials.

5. What will 42 barrels of white ſugar come to, weighing groſs 415 arobes 18 lb. tare and tret on the whole 858 lb. at 26 rials per arobe?

	ar.	lb.
	415	18
858 lb. make	34	8
	381	10
	26	
	2286	
	762	
10 lb. = ⅓ arobe	10	
	8)9916 rials.	
	1239	4

Anſ. 1239 dols. 4 rials.

			dols.	rials.
6.	125 pieces bretagnes at	26 rials	406	2
7.	500 do. do.	24½ do.	1531	2
8.	80 umbrellas	6½ dollars	520	0
9.	147 arobes of butter	25 do. per 100 lb.	918	6
10.	2405 arobes 19 lb. ſugar	25 rials per arobe	7518	0
11.	1660 do. 12 do.	21 do. do.	4358	7
12.	16695 feet boards	40 dols. per M.	667	6

EAST-INDIES.

CALCUTTA.

Accounts are kept in Rupees, Annas, and Pice.

12 pice make 1 anna, 16 annas 1 rupee.

By the *bazar*, or market exchange, for June, 1797, the exchange was, viz.—

100 Engliſh guineas were equal to 956 rupees 4 annas.
100 Spaniſh dollars were equal to 212 rupees.

In Weights—16 chittacks make 1 ſeer, 40 ſeers 1 maud.

The factory maud	is	75 lb. Engliſh.
The bazar maud	is	84 ditto.

The imports are ſold by the factory maud and current rupees.
The exports are bought by the bazar maud and ſicca rupees.

100 ficca rupees are equal to 116 current rupees.

Bednah, tin-plates, and hides are ſold per corge, 20 to a corge.

The cavid is half a yard Engliſh.

1. What will 3905 dry hides amount to, at 12 rupees per corge?

h.		*r.*		*h.*
20	:	12	::	3905
				12
				2\|0)46860
				2343

Anſ. 2343 rupees.

2. How much will 189 bazar mauds 31 ſeers 8 chittacks of ſugar come to, at 6 rupees per maud?

		189	31	8
		6		
		1134		
20 ſeers	½	3		
10	¼	1	8	
1	1/16	0	2	4
8 chit.	½	0	1	2
		1138	11	6

Anſ. 1138 r. 11 a. 6 p.

BOMBAY.

Accounts are kept in Rupees, Quarters, and Rees.

100 rees make 1 quarter; 4 quarters 1 rupee.

218 rupees were equal to 100 Spaniſh dollars, in April, 1800.

The current money is in Mohurs, Rupees, and Pice.
50 pice make 1 rupee; 15 rupees 1 mohur.

The weights are pounds, mauds, and candies; the pound the ſame as Engliſh.

A Bombay maud is 28 lb.

A Surat maud is 37⅓ lb.

21 Surat mauds or 784 lb. make 1 Surat candy.

Cotton is ſold by the Surat candy.

Camphire and Mocha coffee are ſold by the Surat maud.

Malabar pepper is ſold by the Bombay candy of 588 lb.

In 274 bales of cotton, weighing neat 996 cwt. 2 qrs. 23 lb. how many Surat candies?

7[84 lb.] = 7 cwt. 7)996 2 23

142 200 two hundreds
24 exceſs 12 per cent.
56 2 quarters
23

303 Anſ. 142 can. 303 lb.

MADRASS.

Accounts are kept in Pagodas, Fanams, and Caſh.

80 caſh make 1 fanam; 36 fanams 1 pagoda.

The Spaniſh dollars were in 1708 and '90, at 165 dollars for 100 ſtar pagodas; making the pagoda worth 165 cents. The revenue laws of the United States reckon them at 194 cents.

The Bengal, or Sicca new rupee is worth 46 to 47 cents. The revenue laws of the United States value them at 55½ cents.

The current exchange is 340 Sicca rupees, for 100 Star pagodas.

A Lack of rupees is 100,000.

Cowries are ſea ſhells uſed as ſmall money in India, and on the coaſt of Africa, to make change among the natives in the bazar, or market, and in payment to the coolies or labourers. In May, 1792, a rupee was worth 5120 cowries. The common cowries are generally at 5 to 7 rupees per Bazar maud, the better ſort from 10 to 14 rupees per maud, the price varying according to the kind.

The picul is 133⅓ lb. Engliſh.

100 cattas make a picul.

A maud is 25 lb. Troy, 20 mauds make 1 candy.

The excellence of their cloth is defined by the *threads* in the warp.

The duty payable at the cuſtom-houſe is 2½ per cent. outwards and inwards. This is taken on imports according to the invoice, and on exports at the actual coſt at the bazar or market.

BATAVIA.

Accounts are kept in Rix Dollars and Stivers.

The rix dollar	is	48 ſtivers.
The ducatoon	is	80 ditto.
The Spaniſh dollar	is	64 do.; ſometimes it paſſes at 60 ſtivers,

125 lb. Dutch are equal to 133⅓ lb. Engliſh.

125 ditto	make	1 picul.
100 cattas	- -	1 ditto.

1. In 1333 rix dollars 163 ſtivers, how many ducatoons?

1333 16
48
10670
5333
80)64000
Anſ. 800 ducatoons.

2. What will 127477 cattas of bar iron come to, at 9 rix dollars per picul?

cat. *r.d.* *cut.*
As 100 : 9 :: 127477
9
11472,93
48
744
372
44,64
Anſ. 11472 rix dols. 44 ſtiv.

3. What will 3894 bottles of wine come to, at 36 ſtivers per bottle?

3894
24 ſtiv. ½ 1947
12 ½ 973 24
2920 24

Or thus, 36 ſtiv. = ¼ rix dol.
3894
3
4)11682
2920 24

Anſ. 2920 rix dols. 24 ſtiv.

4. In 31478 lb. of ſugar, how many piculs?

125)31478(251
250
647
625
228
125
103 Anſ. 251 piculs 103 lb.

5. In 50632 lb. how many piculs? Anſ. 405 pic. 7 lb.

6. 12648 - - - - 101 23

7. 31478 - - - - 251 103

8. What will 279 piculs 25 lb. of ſugar come to, at $7\frac{1}{2}$ rix dollars per picul?

279
$7\frac{1}{2}$
1953
25=$\frac{1}{4}$ 139 24
1 24
2094 00 Anſ. 2094 rix dols.

CHINA.

Calculations are made in Tales, Mace, Candareens, and Caſh.

10 caſh	make		1 candareen.
10 candareens	-	-	1 mace.
10 mace	-	-	1 tale.

The tale of China is eſtimated at 1 dollar 48 cents in the United States.

The Spaniſh dollar is current at 72 candareens.

Weights are in Tales, Piculs, and Cattas—

16 tales make 1 catta; 100 cattas 1 picul.

A picul is equal to $133\frac{1}{3}$ lb. Engliſh.

The cavid of China is $14\frac{9}{10}$ inches; it is divided into 10 parts.

To change pounds Engliſh to Cattas.

RULE. Deduct 25 per cent. or one quarter, for cattas.

EXAMPLE.

In 62668 lb. Engliſh, how many cattas?

$\frac{1}{4}$)62668
15667

Anſ. 47001 cattas.

To change cattas to pounds Engliſh.

RULE. Add one third for pounds Engliſh.

EXAMPLE.

In 47001 cattas how many lb. Engliſh?

$\frac{1}{3}$)47001
15667

Anſ. 62668 lb. Engliſh.

PRACTICAL QUESTIONS.

1. What is the amount of 308 cheſts of bohea tea, weighing neat 101956 lb. at 15 tales per picul?

$\frac{1}{4}$)101956 lb.
25489

cat.		*tal.*			
100	:	15	:	:	76467 cattas.

15

382335
76467

11470,05 Anſ. 11470 tales 5 cand.

2. What will 75 cheſts of ſouchong tea come to, weighing neat 4875 lb. at 44 tales per picul?

$\frac{1}{4}$)4875
1218$\frac{3}{4}$

3656$\frac{1}{4}$ cattas.
44

14624
14624
11

1608,75 Anſ. 1608 tal. 7 ma. 5 cand.

3. How many dollars will pay for an invoice of tea, amounti to 6446 tales 1 mace 6 candareens?

72)6446 1 6(8953
576
686
648
381
360
216
216
Anſ. 8953 dols.

MANILLA.

Accounts are kept in Dollars, Rials, and Quartos.

12 quartos make 1 rial; 8 rials 1 dollar.

The arobe is 25 lb. $5\frac{1}{2}$ arobes make 1 picul.

Their 100 lb. is equal to 104 lb. Engliſh.

1. What will 1897 bags of ſugar amount to, weighing neat 136 piculs 1 arobe $17\frac{1}{2}$ lb. at 6 dollars per arobe?

1361 1 $17\frac{1}{2}$
6
8166

1 ar.	$\frac{1}{2}$	1 $\frac{1}{2}$
$12\frac{1}{2}$ lb.	$\frac{1}{2}$	$4\frac{1}{4}$
5	$\frac{1}{5}$	$1\frac{1}{4}$

8168 0 Anſ. 8168 dollars.

		pic. ar. lb.	*dol. ri.*	*dol.*
2.	118 bags of ſugar, weighing	89 1 $22\frac{1}{2}$	at 5 7	Anſ. 524
3.	663 do. do.	469 3 18	6	2819

COLUMBO, ISLE OF CEYLON.

The money is in paper, ſilver, and gold.

Paper money is in the bills of the Company, and is of uncerta value

Silver is in the rupees of different parts of India.

The Sicca rupee is worth more than any other by 7 to 8 per cent.

Gold is the Mohur pagoda.

The exchange is various, as ſilver is rarely ſeen.

16 ſtivers	make	1 ſhilling Flemiſh.
8 ſhillings	-	1 rix dollar.
30 ſtivers	-	1 rupee.
64½ do.	-	1 Spaniſh dollar.

JAPAN.

Accounts are in Tales, Mace, and Candareens.

10 candareens	make	1 mace.
10 mace	-	1 tale=¾ of a dollar, or 75 cents.

Ten mace are equal to 1 rix dollar.

Six tales make a corban, a gold coin not uſed in accounts.

In Weights—10 tales make 1 mace; 16 mace 1 catta.

The ichan or hickey is 3½ feet.

The balee is 65 quarts.

Thirty-five per cent. was the duty on privileged imports in 1799. 3 on the exports (which are all free of duty) that the Dutch make r profit upon their return to Batavia. A privilege is granted to captain of the Dutch ſhips to carry money, which often ſells at dvance.

How much is the neat proceeds of 4 ſilver watches, at 35 tales , deducting the duty of 35 per cent.?

35 tales.
4

140
35 per cent.

700
420

Sales 140
Duty 49

49,00 Anſ. neat proceeds 91 tales.

Form of an Account of Sales.

	tales.	Duties. *tales.*	Neat. *tales.*
4 ſilver watches, 1ſt kind	35	49	91
6 ſilver watches, 2d kind	23,1	48,5,1	90,0,9

The article is given in the firſt column, the price in the next column, the duties in the third, and the neat proceeds in the fourth.

PARTICULARS OF THE *TONNAGE* OF *GOODS*,

As calculated to make up the Tonnage for the Freight of Goods brought in Eaſt-India or China Ships to Europe, viz.

PIECE-GOODS.

FORT ST. GEORGE.	Pieces to the Ton.
Allejars	800
Betellees	400
Callawapores	800
Chintz of all ſorts	R.400
Ginghams	800
Izzarees	800
Longcloths	160
Moorees	800
Sallampores	400
Saftracundies	800
BENGAL.	
Addaties	700
Alliballies	400
Allachaws	1200
Allibannies	R.800
Arras	R.400
Atchabannies	800
Baftaes	R.400
Bandannoes, or Taffa de Poolas	R.800
Carridarries	600
Callipatties	400

BENGAL.	Pieces to the Ton.
Coopees	600
Callicoes	400
Chillaes	600
Chowtars	600
Chunderbannies	800
Chinachures	R.800
Cambrics	R.400
Chucklaes	400
Cuſhtaes	800
Coſſaes	400
Charconnaes	600
Cuttannees	R.800
Dooſooties	R.400
Dungaries	R.400
Doreas	400
Dimities	600
Diapers, broad	400
Ditto narrow	600
Elatches	R.800
Emmerties	600
Gurrahs	400
Ditto long	200
Ginghams, coloured	600

PIECE-GOODS.

BENGAL.

	Pieces to the Ton.
hums - -	400
ffies - -	600
hums, quilted -	100
lannies - -	800
vars - -	600
owries - -	600
gees Herba -	800
muls - -	400
handkerchiefs -	400
amodietes - -	400
odies - -	R.400
es - -	800
ſooks - -	400
ſcoos - -	800
aes - -	R.800
ulas - -	800
ahs - -	R.400
als - -	R.800
oes - -	400
etties - -	400
ands - -	600
uckers - -	600
haudconnaes -	400
hauds - -	R.400
afts - -	400
lbafts - -	400
atoons - -	R.800
cys - -	400
- -	400
ties of all ſorts -	R.800
eebs - -	400
ys - -	R.800
indams -	400
ſooks : -	400

BOMBAY.

abatches - -	R.400
bay ſtuffs -	R.400
mpauts - -	400
tapauts - -	R.400
lchawders or brawls	1200
llees - -	400
loes - -	R.400
tz of all ſorts -	R.400

BOMBAY.

	Pieces to the Ton.
Dooties - -	R.400
Guinea ſtuffs, large	600
Ditto, ſmall - -	1200
Longcloths, whole pieces	160
Ditto, half ditto -	320
Lemanees - -	R.800
Muſters - -	400
Nunſarees - -	R.400
Neganepauts -	400
Niccanees, large -	600
Ditto ſmall -	600
Salampores -	400
Stuffs brown - -	R.400
Tapſeils, large -	400
Ditto, ſmall -	600

CHINA.

Nankeen cloth -	R.400
Silks of all ſorts -	R.800

China ware, 50 cubical feet to the ton, or about 4 cheſts of the uſual dimenſions.

Other meaſurable goods, 50 cubical feet to the ton.

N. B. Where the letter R. is ſet againſt pieces of 400 to the ton, it ſhews thoſe goods are to be reduced, or brought to a ſtandard of 16 yards long and 1 broad.

Where againſt pieces of 800 to the ton, to 10 yards long and 1 broad.

EXAMPLE.

1000 pieces of 12 yards long and $1\frac{1}{8}$ broad, at 400 to the ton, make 844 pieces, or 2 tons 44 pieces.

1000 pieces of $10\frac{1}{2}$ yards long and $1\frac{1}{8}$ broad, at 800 to the ton, is 1181 pieces, or 1 ton 381 pieces.

WEIGHABLE GOODS.

	Cwt. to the Ton.
Arrangoes	20
Aloes	16
Benjamin	20
Borax	20
Cardemoms, Fine goods	12
Cakelack	16
Carmenia Wool	10
Cambogium	20
Caſſia Lignea	8
Caſſia Buds	12
Camphire	15
Cotton Yarn, Fine Goods	10
Cowries Gruff ditto	20
Coffee Fine ditto	18
Cinnabar	10
Cloves	12
Dragon's Blood	20
Gum Arabic	16
—— Elemi	16
—— Ammoniacum	16
—— Opoponax	16
—— Sagapenum	18
—— Sarcocol	18
Indigo	12
Iron Kintlage	20
Muſk	20
Myrrh	16
Mother-of-Pearl Shells	20
Nux Vomica	15
Pepper	16
Quickſilver	20
Rhubarb	8
Raw Silk	10
Ditto in cheſts	8
Ditto in bales or bundles	10
Redwood	20
Rice	20
Shellack	16
Seedlack	18
Sticklack	16
Saltpetre	20
Senna	8
Sago	16
Ditto packed in China ware	—
Tutenague	20
Turmeric	16
Tincal	16
Tea, Green	8
——, Bohea	10
Arrack Gauge gallons	251
Canes Tale	300
Wanghees and Bamboes	3000
Rattans equal to 16 cwt.	6000

AMERICAN DUTIES

Are calculated as in the following Examples.

1. What is the duty on 2885 gallons of molaſſes, at 5 cents per gallon?

2885
5

14425 cents. Anſ. 144 dols. 25 cts.

2. What is the duty on the above molaſſes, if imported in a foreign veſſel, the rate being $5\frac{1}{2}$ cents per gallon, or 10 per cent. more than an American veſſel?

2885
$5\frac{1}{2}$

14425
$1442\frac{1}{2}$

Dols. $158,67\frac{1}{2}$

Or, 144,25 as above.
10 per cent. $14,42\frac{1}{2}$

Dols. $158,67\frac{1}{2}$

3. How much is the duty on 3720 gallons of gin, at $31\frac{9}{10}$ cents per gallon?

3720
$31\frac{9}{10}$

3720
11160
3348

dolls. 1186,68

3720
9

10)33480

3348

Anſ. 1186 dolls. 68 cts.

		dols.	cts.
4.	1273 lb. chocolate at 3 cents - -	Anſ. 38	19
5.	965 lb. do. in a foreign veſſel at $3\frac{3}{10}$ do.	31	$84\frac{1}{2}$
6.	1149 lb. cheeſe at 7 ditto - -	80	43
7.	1295 lb. do. in a foreign veſſel at $7\frac{7}{10}$ do.	99	$71\frac{1}{4}$
8.	1879 gals. Champaign wine at 45 do.	845	55
9.	2675 gals. London particular Madeira at 58 do.	1551	50

10. What is the duty on 53 cwt. 2 qrs. 21 lb. of untarred Cordage, at 225 cents per cwt. ?

		225
		53
		675
		1125
2 qrs.	$\frac{1}{2}$	112$\frac{1}{2}$
14 lb.	$\frac{1}{4}$	28
7 do.	$\frac{1}{8}$	14
		120,79$\frac{1}{2}$

Anſ. 120 dols. 79$\frac{1}{2}$ cts.

11. What is the duty on the above cordage in a foreign veſſel, at 247$\frac{1}{2}$ cts. per cwt. ? Anſ. 132 dols. 87$\frac{1}{4}$ cts.

12. How much is the duty on 4 hhds. of brown ſugar, wt. groſs 38 cwt. 3 qrs. 19 lb. tare 12 lb. per 100, at 2$\frac{1}{2}$ cents per lb. ?

	3800	
	456 = exceſs 12 per cent.	
	84	
	19	
groſs	4359	4359
tare	523	12
	3836	523,08
	2$\frac{1}{4}$	
	7672	
	1918	
	95,90	

Anſ. 95 dols. 90 cents.

13. What is the duty on this ſugar, in a foreign veſſel, at 2$\frac{1}{4}$ cts. per lb. ? Anſ. 105 dols. 49 cts.

The mode of eſtimating ad valorem rates of duty.

The ad valorem rates of duty, upon goods, wares and merchandizes, at the place of importation, ſhall be eſtimated by adding 20 per cent. to the actual coſt thereof, if imported from the Cape of Good Hope, or from any other place beyond the ſame, and ten per cent. on the actual coſt thereof, if imported from any other place or country, including all charges; commiſſions, outſide packages and inſurance excepted.—(See laws of the United States.)

EXAMPLES.

1. What is the duty on an invoice of ſilver and plated ware imported from London, the coſt, excluſive of commiſſions, &c. being £.359 18 4, at 15 per cent. ad valorem?

		359
		444 cents per £. ſter.
		1436
		1436
		1436
10 s.	½	222
5	¼	111
3 4 d.	⅓	74
actual coſt		159803 cents.
10 per cent. added		15980
		175783
10	1/10	17578
5	½	8789
for 15 per cent.		263.67 cents.

Anſ. 263 dols. 67 cents.

2. What will it amount to in a foreign veſſel, at 16½ per cent. ad valorem? Anſ. 290 dols. 4 cts.

The rates at which all foreign coins and currencies are eſtimated at the Cuſtom-Houſes of the United States.

	Dols.	*Cts.*
Each pound ſterling of Great-Britain, at	4	44
Each pound ſterling of Ireland	4	10
Each livre tournois of France		18½
Each florin or gilder of the United Netherlands		40
Each mark banco of Hamburgh		33⅓
Each rix dollar of Denmark	1	
Each rial of plate of Spain		10
Each rial of vellon of Spain		5
Each milree of Portugal	1	24
Each tale of China	1	48
Each pagoda of India	1	94
Each rupee of Bengal		55⅑

PROGRESSION

Conſiſts in two parts—ARITHMETICAL and GEOMETRICAL.

ARITHMETICAL PROGRESSION

Is when a rank of numbers increaſe or decreaſe regularly, by the continual adding or ſubtracting of ſome equal number: As 1, 2, 3, 4, 5, 6, are in Arithmetical Progreſſion by the continual increaſing or adding of one, and 11, 9, 7, 5, 3, 1, by the continual decreaſe or ſubtraction of two.

NOTE. When any even number of terms differ by Arithmetical Progreſſion, the ſum of the two extremes will be equal to the two middle numbers, or any two means equally diſtant from the extremes: As 2, 4, 6, 8, 10, 12, where 6+8, the two middle numbers are = 12+2, the two extremes, and = 10+4 the two means = 14.

When the number of terms are odd, the double of the middle term will be equal to the two extremes, or of any two means equally diſtant from the middle term: As 1, 2, 3, 4, 5, where the double of 3=5+1=2+4=6.

In Arithmetical Progreſſion five things are to be obſerved, *viz.*

1. The firſt term.
2. The laſt term.
3. The number of terms.
4. The equal difference.
5. The ſum of all the terms.

Any three of which being given, the other two may be found.

The firſt, ſecond and third term given to find the fifth.

RULE. Multiply the ſum of the two extremes by half the number of terms, or multiply half the ſum of the two extremes by the whole number of terms, the product is the total of all the terms.

EXAMPLES.

1. How many ſtrokes does the hammer of a clock ſtrike in 12 hours?

12+1=13 *then* 13×6=78 Anſ.

2. A man buys 17 yards of cloth, and gave for the firſt yard 2*s.* and for laſt 10*s.* what did the 17 yards amount to?

Anſ. £.5 2*s.*

3. If 100 eggs were placed in a right line, exactly a yard aſunder from one another, and the firſt a yard from a baſket, what length of ground does that man go who gathers up theſe 100 eggs ſingly, returning with every egg to the baſket to put it in?

Anſ. 5 miles, 1300 yards.

The firſt, ſecond and third terms given to find the fourth.

RULE. From the ſecond ſubtract the firſt, the remainder divided by the third leſs one gives the fourth.

EXAMPLES.

1. A man had 8 ſons, the youngeſt was 4 years old, and the eldeſt 32, they increaſe in Arithmetical Progreſſion, what was the common difference of their ages? Anſ. 4.

32—4=28 then 28÷8—1=4 the common difference.

2. A man is to travel from Boſton to a certain place in 12 days, and to go but 3 miles the firſt day, increaſing every day by an equal exceſs, ſo that the laſt day's journey may be 58 miles, what is the daily increaſe, and how many miles diſtant is that place from Boſton?

Anſ. 5 miles daily increaſe.

Therefore as 3 miles is the firſt day's journey;
3+5= 8 ſecond ditto.
8+5=13 third ditto, &c.
The whole diſtance is 366 miles.

The firſt, ſecond and fourth terms given to find the third.

RULE. From the ſecond ſubtract the firſt, the remainder divide by the fourth, and to the quotient add 1, gives the third.

EXAMPLES.

1. A perſon travelling into the country, went 3 miles the firſt day, and increaſed every day by 5 miles, till at laſt he went 58 miles in one day, how many days did he travel? Anſ. 12.

58—3=55 then 55÷5=11 and 11+1=12 the number of days.

2. A man being aſked how many ſons he had, ſaid, that the youngeſt was 4 years old, and the eldeſt 32, and that he increaſed one in his family every 4 years, how many had he? Anſ. 8.

The ſecond, third and fourth given to find the firſt.

RULE. Multiply the fourth by the third, made leſs by 1, the product ſubtracted from the ſecond gives the firſt.

EXAMPLES.

1. A man in 10 days went from Boſton to a certain town in the country, every day's journey increaſing the former by 4, and the laſt day he went was 46 miles, what was the firſt? Anſ. 10 miles.

4×10—1=36 then 46—36=10, the firſt day's journey.

2. A man takes out of his pocket at 8 ſeveral times, ſo many different numbers of ſhillings, every one exceeding the former by 6; the laſt 40, what was the firſt? Anſ. 4.

The ſecond, third and fifth given to find the firſt.

RULE. Divide the fifth by the third, and from the quotient ſubtract half the product of the fourth multiplied by the third leſs 1, gives the firſt.

EXAMPLE.

A man is to receive £.360 at 12 ſeveral payments, each to exceed the former by £.4 and is willing to beſtow the firſt payment on any one that can tell him what it is, what will that perſon have for his pains? Anſ. £.8.

$$360 \div 12 = 30 \text{ then } 30 - \frac{4 \times 12 - 1}{2} = 8. \text{ the firſt payment.}$$

The firſt, third and fourth given to find the ſecond.

RULE. Subtract the fourth from the product of the third, multiplied by the fourth, that remainder added to the firſt gives the ſecond.

EXAMPLE.

What is the laſt number of an Arithmetical Progreſſion, beginning at 6, and continuing by the increaſe of 8 to 20 places? Anſ. 158.

$20 \times 8 - 8 = 152$ then $152 + 6 = 158$, the laſt number.

GEOMETRICAL PROGRESSION

Is the increaſing or decreaſing of any rank of numbers by ſome common ratio, that is, by the continual multiplication or diviſion of ſome equal number: As 2, 4, 8, 16 increaſe by the multiplier 2, and 16, 8, 4, 2 decreaſe by the diviſor 2.

NOTE. When any number of terms is continued in Geometrical Progreſſion, the product of the two extremes will be equal to any two means, equally diſtant from the extremes: As 2, 4, 8, 16, 32, 64, where $64 \times 2 = 4 \times 32 = 8 \times 16 = 128$.

When the number of terms are odd, the middle term multiplied into itſelf will be equal to the two extremes, or any two means, equally diſtant from the mean: As 2, 4, 8, 16, 32, where $2 \times 32 = 4 \times 16 = 8 \times 8 = 64$.

In Geometrical Progreſſion the ſame five things are to be obſerved, as in Arithmetical, viz.

1. The firſt term.
2. The laſt term.
3. The number of terms.
4. The equal difference or ratio.
5. The ſum of all the terms.

NOTE. As the laſt term in a long ſeries of numbers is very tedious to come at, by continual multiplication; therefore, for the readier finding it out, there is a ſeries of numbers made uſe of in Arithmetical Proportion, called indices, beginning with an unit, whoſe common difference is one, whatever number of indices you make uſe of, ſet as many numbers (in ſuch Geometrical Proportion as is given in the queſtion) under them:

As 1, 2, 3, 4, 5, 6 indices.
2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

But if the firſt term in Geometrical Proportion be different from the ratio, the indices muſt begin with a cypher.

As 0, 1, 2, 3, 4, 5, 6 indices,
1, 2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

When the indices begin with a cypher, the ſum of the indices made choice of muſt be always one leſs than the number of terms given in the queſtion, for 1 in the indices is over the ſecond term, and 2 over the third, &c.

Add any two of the indices together, and that ſum will agree with the product of their reſpective terms.

As in the firſt table of indices $2+5=7$
Geometrical Proportion $4\times32=128$

Then in the ſecond $2+4=6$
$4\times16=64$

In any Geometrical Progreſſion proceeding from unity the ratio being known, to find any remote term, without producing all the intermediate terms.

RULE. Find what figures of the indices added together would give the exponent of the term wanted, then multiply the numbers ſtanding under ſuch exponent into each other, and it will give the term required.

NOTE. When the exponent 1 ſtands over the ſecond term, the number of exponents muſt be 1 leſs than the number of terms.

EXAMPLES.

1. A man agrees for peaches, to pay only the price of the laſt, reckoning a farthing for the firſt, a half-penny for the ſecond, &c. doubling the price to the laſt, what muſt he give for them?

0, 1, 2, 3, 4, exponents.
1, 2, 4, 8, 16, number of terms.

4+4+3=11, number of terms leſs 1.

16=4
16=4
256=8
8=3
4)2048=11 numb. farth.
12)512
20)42 8
£.2 2 8 Anſwer.

2. A country gentleman going to a fair to buy ſome oxen, meets with a perſon who had 23, he demanding the price of them, was anſwered, £.16 apiece; the gentleman bids him £.15 apiece, and he would buy all; the other tells him it would not be taken, but if he would give what the laſt ox would come to, at a farthing for the firſt, and doubling it to the laſt, he ſhould have all. What was the price of the oxen? Anſ. £.4369 15. 4d.

In any Geometrical Progreſſion, not proceeding from unity, the ratio being given, to find any remote term, without producing all the intermediate terms.

RULE. Proceed as in the laſt, only obſerve that every product muſt be divided by the firſt term.

EXAMPLES.

1. A ſum of money is to be divided among eight perſons, the firſt to have £.20, the ſecond £.60, and ſo on in triple proportion, what will the laſt have?

0. 1. 2. 3.
20. 60. 180. 540.

$\frac{540\times540}{20}=14580$ then $\frac{14580\times60}{20}=43740$

Anſ. £.43740.

3+3+1=7 one leſs than the number of terms.

2. A gentleman dying, left 9 ſons, to whom and to his executors, he bequeathed his eſtate in manner following: To his executor £.50; his youngeſt ſon was to have as much more as the executor, and each ſon to exceed the next younger by as much more; what was the eldeſt ſon's portion? Anſ. £.25600.

The firſt term, ratio, and number of terms given, to find the ſum of all the terms.

RULE. Find the laſt term as before, then ſubtract the firſt from it, and divide the remainder by the ratio leſs one, to the product of which add the greater, and it gives the ſum required.

EXAMPLES.

1. A ſervant ſkilled in numbers agreed with a gentleman to ſerve him 12 months, provided he would give him a farthing for his firſt month's ſervice, a penny for the ſecond, and 4*d.* for the third, &c.—what did his wages amount to?

$256 \times 256 = 65536$, then $65536 \times 64 = 4194304$

0. 1. 2. 3. 4.
1. 4. 16. 64. 256.
(4+4+3=11 No. of terms leſs 1.)

$$\frac{4194304-1}{4-1} = 1398101 \text{ ; then}$$

1398101+4194304=5592405 farthings.

Anſ. £.5825 8*s.* 5¼*d.*

2. A man bought a horſe, and by agreement was to give a farthing for the firſt nail, three for the ſecond, &c.; there were 4 ſhoes, and in each ſhoe 8 nails; what was the worth of the horſe?

Anſ. £.9651146816693 13*s.* 4*d.*

3. A certain perſon married his daughter on new-year's day, and gave her huſband one ſhilling towards her portion, promiſing to double it on the firſt day of every month for one year; what was her portion? Anſ. £.204 15*s.*

4. A laceman well verſed in numbers agreed with a gentleman to ſell him 22 yards of rich gold brocaded lace, for 2 pins the firſt yard, 6 pins the ſecond, &c. in triple proportion. I deſire to know what he ſold the lace for, if the pins were valued at 100 for a farthing; alſo, what the laceman got or loſt by the ſale thereof, ſuppoſing the lace ſtood him in £.7 pounds per yard.

Anſ. The lace ſold for £.326886 0*s.* 9*d.*
Gain £.326732 0*s.* 9*d.*

PERMUTATION

IS the changing or varying of the order of things.

RULE. Multiply all the given terms, one into another, and the laſt product will be the number of changes required.

EXAMPLES.

1. How many changes may be rung upon 12 bells, and how long would they be ringing but once over, ſuppoſing 10 changes might be rung in one minute, and the year to contain 365 days 6 hours?

1×2×3×4×5×6×7×8×9×10×11×12=479001600 changes, which ÷ 10 = 47900160 minutes, and if reduced is = 91 years 3 weeks 5 days and 6 hours.

2. A young ſcholar coming into a town for the conveniency of a good library, demands of a gentleman with whom he lodged, what his diet would coſt for a year, who told him £.10; but the ſcholar not being certain what time he ſhould ſtay, aſked him what he muſt give him for ſo long as he could place his family (conſiſting of ſix perſons beſides himſelf) in different poſitions, every day, at dinner; the gentleman, thinking it could not be long, tells him £.5, to which the ſcholar agrees; what time did the ſcholar ſtay with the gentleman? Anſ. 5040 days.

EXTRACTION OF THE SQUARE ROOT.

EXTRACTING the Square Root is to find out ſuch a number as being multiplied into itſelf, the product will be equal to the given number.

RULE. 1. Point the given number, beginning at the unit's place, then to the hundred's, and ſo upon every ſecond figure throughout.

2. Seek the greateſt ſquare number in the firſt point, towards the left hand, placing the ſquare number under the firſt point, and the root thereof in the quotient; ſubtract the ſquare number from the firſt point, and to the remainder bring down the next point, and call that the reſolvend.

3. Double the quotient, and place it for a diviſor on the left hand of the reſolvend; ſeek how often the diviſor is contained in the reſolvend (reſerving always the unit's place) and put the anſwer in the quotient, and alſo on the right hand ſide of the diviſor; then multiply by the figure laſt put in the quotient, and ſubtract the product from the reſolvend; bring down the next point to the remainder (if there be any more) and proceed as before.

ROOTS.	1.	2.	3.	4.	5.	6.	7.	8.	9.
SQUARES.	1.	4.	9.	16.	25.	36.	49.	64.	81.

EXAMPLES.

1. What is the ſquare root of 119025?

. . .

119025(345
9

64)290
256

685)3425
3425

Anſ. 345.

2. What is the ſquare root of 106929? Anſ. 327
3. What is the ſquare root of 2268741? Anſ. 1506,23+
4. What is the ſquare root of 7596796? Anſ. 2756,228+
5. What is the ſquare root of 36372961? Anſ. 6031
6. What is the ſquare root of 22071204? Anſ. 4698

When the given number conſiſts of a whole number and decimals together, make the number of decimals even, by adding cyphers to them, ſo that there may be a point fall on the unit's place of the whole number.

7. What is the ſquare root of 3271,4007? Anſ. 57,19+
8. What is the ſquare root of 4795,25731? Anſ. 69,247+
9. What is the ſquare root of 4,372594? Anſ. 2,091+
10. What is the ſquare root of 2,2710957? Anſ. 1,50701+
11. What is the ſquare root of ,00032754? Anſ. ,01809+
12. What is the ſquare root of 1,270054? Anſ. 1,1269+

To extract the ſquare root of a vulgar fraction.

RULE. Reduce the fraction to its loweſt terms, then extract the ſquare root of the numerator for a new numerator, and the ſquare root of the denominator for a new denominator.

If the fraction be a ſurd, (i. e.) a number whoſe root can never be exactly found, reduce it to a decimal, and extract the root from it.

EXAMPLES.

13. What is the ſquare root of $\frac{2304}{5184}$? Anſ. $\frac{2}{3}$.
14. What is the ſquare root of $\frac{2704}{4225}$? Anſ. $\frac{4}{5}$.
15. What is the ſquare root of $\frac{9216}{12544}$? Anſ. $\frac{6}{7}$.

SURDS.

16. What is the ſquare root of $\frac{375}{347}$? Anſ. ,89802+
17. What is the ſquare root of $\frac{347}{476}$? Anſ. ,86602+
18. What is the ſquare root of $\frac{478}{749}$? Anſ. ,93308+

To extract the ſquare root of a mixed number.

RULE. 1. Reduce the fractional part of the mixed number to its loweſt term, and then the mixed number to an improper fraction.

2. Extract the roots of the numerator and denominator for a new numerator and denominator.

If the mixed number given be a ſurd, reduce the fractional part to a decimal, annex it to the whole number, and extract the ſquare root thereſrom.

EXAMPLES.

19. What is the ſquare root of $51\frac{2}{25}$? Anſ. $7\frac{1}{5}$.
20. What is the ſquare root of $27\frac{9}{196}$? Anſ. $5\frac{1}{4}$.
21. What is the ſquare root of $5\frac{43}{49}$? Anſ. $3\frac{1}{7}$.

SURDS.

22. What is the ſquare root of $85\frac{14}{25}$? Anſ. 9,27+
23. What is the ſquare root of $8\frac{1}{2}$? Anſ. 2,9519+
24. What is the ſquare root of $6\frac{2}{5}$? Anſ. 2,5298+

The APPLICATION.

1. There is an army conſiſting of a certain number of men, who are placed rank and file, that is, in the form of a ſquare, each ſide having 576 men, I deſire to know how many the whole ſquare contains. Anſ. 331776.

2. A certain pavement is made exactly ſquare, each ſide of which contains 97 feet, I demand how many ſquare feet are contained therein? Anſ. 9409.

To find a mean proportional between any two given numbers.

RULE. The ſquare root of the product of the given numbers is the mean proportional ſought.

EXAMPLES.

1. What is the mean proportional between 3 and 12?
Anſ. $3 \times 12 = 36$ then $\sqrt{36} = 6$ the mean proportional.

2. What is the mean proportional between 4276, and 842?
Anſ. 1897,4+

To find the ſide of a ſquare equal in area to any given ſuperficies.

RULE. The ſquare root of the content of any given ſuperficies, is the ſquare equal ſought.

EXAMPLES.

3. If the content of a given circle be 160, what is the ſide of the ſquare equal? Anſ. 12,64911.

4. If the area of a circle is 750, what is the ſide of the ſquare equal? Anſ. 27,38612

The area of a circle given to find the diameter.

RULE. As 355 : 452, or as 1 : 1,273239 : : ſo is the area : to the ſquare of the diameter; — or, multiply the ſquare root of the area by 1,12837, and the product will be the diameter.

EXAMPLE.

5. What length of cord will fit to tie to a cow's tail, the other end fixed in the ground, to let her have liberty of eating an acre of graſs, and no more, ſuppoſing the cow and tail to be 5 yards and a half? Anſ. 6,136 perches.

The area of a circle given to find the periphery, or circumference.

RULE. As 113 : 1420, or as 1 : 12,56637 : : the area : to the ſquare of the periphery, or multiply the ſquare root of the area by 3.5449, and the product is the circumference.

EXAMPLES.

6. When the area is 12, what is the circumference?
Anſ. 12,2798.

7. When the area is 160, what is the periphery?
Anſ. 44,84.

Any two ſides of a right angled triangle given to find the third ſide.

1. The baſe and perpendicular given to find the hypothenuſe.

RULE. The ſquare root of the ſum of the ſquares of the baſe and perpendicular is the length of the hypothenuſe.

EXAMPLES.

8. The top of a caſtle from the ground is 45 yards high, and is ſurrounded with a ditch 60 yards broad, what length muſt a ladder be to reach from the outſide of the ditch to the top of the caſtle?
Anſ. 75 yards.



9. The wall of a town is 25 feet high, which is ſurrounded by a moat of 30 feet in breadth, I deſire to know the length of a ladder that will reach from the outſide of the moat to the top of the wall.

Anſ. 39,05 feet.

The hypothenuſe and perpendicular given to find the baſe.

RULE. The ſquare root of the difference of the ſquares of the hypothenuſe and perpendicular is the length of the baſe.

The baſe and hypothenuſe given to find the perpendicular.

RULE. The ſquare root of the difference of the hypothenuſe and baſe is the heighth of the perpendicular.

N. B. The two laſt queſtions may be varied for examples to the two laſt propoſitions.

Any number of men being given to form them into a ſquare battle, or to find the number of ranks and files.

RULE. The ſquare root of the number of men given, is the number of men either in rank or file.

10. An army conſiſting of 331776 men, I deſire to know how many in rank and file? Anſ. 576.

11. A certain ſquare pavement contains 48841 ſquare ſtones, all of the ſame ſize, I demand how many are contained in one of the ſides. Anſ. 221.

EXTRACTION OF THE CUBE ROOT.

TO extract the Cube Root is to find out a number which being multiplied into itſelf, and then into that product, produceth the given number.

RULE. Point every third figure of the cube given, beginning at the unit's place, ſeek the greateſt cube to the firſt point and ſubtract it therefrom, put the root in the quotient, and bring down the figures in the next point to the remainder for a reſolvend.

2. Find a diviſor by multiplying the ſquare of the quotient by 3. See how often it is contained in the reſolvend, rejecting the units and tens, and put the anſwer in the quotient.

3. To find the ſubtrahend. 1. Cube the laſt figure in the quotient. 2. Multiply all the figures in the quotient by 3. except the laſt, and that product by the ſquare of the laſt. 3. Multiply the diviſor by the laſt figure. Add theſe products together, gives the ſubtrahend, which ſubtract from the reſolvend; to the remainder bring down the next point and proceed as before.

ROOTS. 1. 2. 3. 4. 5. 6. 7. 8. 9.
CUBES. 1. 8. 27. 64. 125. 216. 343. 512. 729.

EXAMPLES.

1. What is the cube root of 99252847?

```
                    . . .
                99252847(463
                64=Cube of 4.
          Divisor. -------
Square of 4×3=48)35252 Resolvend.
                 216=Cube of 6.
                 432 =4×3× by square of 6.
                 288 =Divisor × by 6.
                 -----
                33336 Subtrahend.
          Divisor. -------
Square of 46×3=6348)1916847 Resolvend.
                    27=Cube of 3.
                  1242 =46×3× by Square of 3.
                 19044 =Divisor × by 3.
                 -------
                1916847 Subtrahend.
```

Another new and more concise method of extracting the Cube Root.

RULE. 1. Point every third figure of the cube given, beginning at the unit's place, then find the nearest cube to the first point, and subtract it therefrom, put the root in the quotient, bring down the figures in the next point to the remainder for a resolvend.

2. Square the quotient and triple the square for a divisor—as $4\times4\times3=48$. Find how often it is contained in the resolvend, rejecting units and tens, and put the answer in the quotient.

3. Square the last figure in the quotient, and put it on the right hand of the divisor:

As $6\times6=36$ put to the divisor $48=4836$.

4. Triple the last figure in the quotient, and multiply by the former, put it under the other, units under the tens, add them together, and multiply the sum by the last figure in the quotient, subtract that product from the resolvend, bring down the next point and proceed as before.

EXAMPLES.

What is the cube root of 99252847 ?

Square of $4\times3=48$ Diviſor. 99252847(463
Square of 6, put to $48=4836$ 64
$6\times3\times4=72$ 35252
$5556\times6=$ 33336
Square of $46=2116\times3=6348$ Diviſor 1916847
Square of $3=9$ put to $6348=$ *634809
$3\times3\times46=414$
$638949\times3=1916847$

2. What is the cube root of 389017 ? Anſ. 73.
3. What is the cube root of 5735339 ? Anſ. 179.
4. What is the cube root of 32461759 ? Anſ. 319.
5. What is the cube root of 84604519 ? Anſ. 439.
6. What is the cube root of 259694072 ? Anſ. 638.
7. What is the cube root of 48228544 ? Anſ. 364.
8. What is the cube root of 27054036008 ? Anſ. 3002.
9. What is the cube root of 22069810125 ? Anſ. 2805.
10. What is the cube root of 12261532732 ? Anſ. 4968.
11. What is the cube root of 21936532791 ? Anſ. 6031.
12. What is the cube root of 673373097125 ? Anſ. 8765.

When the given number conſiſts of a whole number and decimal together, make the number of decimals to conſiſt of 3, 6, 9, &c. places, by adding cyphers thereto, ſo that there may be a point fall on the unit's place of the whole number.

13. What is the cube root of 12.977875 ? Anſ. 2,35
14. What is the cube root of 36155.027576 ? Anſ. 33,06+
15. What is the cube root of ,001906624 ? Anſ. ,124
16. What is the cube root of 33.230979637 ? Anſ. 3.215+
17. What is the cube root of 15926,972504 ? Anſ. 25,19+
18. What is the cube root of ,053258279 ? Anſ. ,376 +

To extract the Cube Root of a Vulgar Fraction.

RULE. Reduce the fraction to its loweſt terms, then extract the cube root of the numerator and denominator for a new numerator and denominator, but if the fraction be a ſurd, reduce it to a decimal, and then extract the root from it.

EXAMPLES.

19. What is the cube root of $\frac{210}{686}$? Anſ. $\frac{5}{7}$.
20. What is the cube root of $\frac{324}{1500}$? Anſ. $\frac{3}{5}$.

* When the quotient is 2 or 3 there muſt be a cypher put to ſupply the place of tens,

21. What is the cube root of $\frac{1120}{3430}$? Anſ. $\frac{2}{3}$.

SURDS.

22. What is the cube root of $\frac{4}{7}$? Anſ. ,829+
23. What is the cube root of $\frac{5}{9}$? Anſ. ,822+
24. What is the cube root of $\frac{2}{3}$? Anſ. ,873+

To extract the Cube Root of a mixt number.

RULE. Reduce the fractional part to its loweſt terms, and then the mixt number to an improper fraction, extract the cube roots of the numerator and denominator for a new numerator and denominator; but if the mixt number given be a ſurd, reduce the fractional part to a decimal, annex it to the whole number, and extract the root therefrom.

EXAMPLES.

25. What is the cube root of $12\frac{19}{27}$? Anſ. $2\frac{1}{3}$.
26. What is the cube root of $31\frac{15}{343}$? Anſ. $3\frac{1}{7}$.
27. What is the cube root of $405\frac{29}{125}$? Anſ. $7\frac{2}{5}$.

SURDS.

28. What is the cube root of $7\frac{1}{2}$? Anſ. 1.93+
29. What is the cube root of $9\frac{1}{6}$? Anſ. 2,092+
30. What is the cube root of $8\frac{1}{7}$? Anſ. 2,057+

THE APPLICATION.

1. If a cubical piece of timber be 47 inches long, 47 inches broad, and 47 inches deep, how many cubical inches doth it contain?
Anſ. 103823.

2. There is a cellar dug that is 12 feet every way, in length, breadth and depth, how many ſolid feet of earth were taken out of it?
Anſ. 1728.

3. There is a ſtone of a cubic form, which contains 389017 ſolid feet, what is the ſuperficial content of one of its ſides?
Anſ. 5329.

Between two numbers given, to find two mean proportionals.

RULE. Divide the greater extreme by the leſſer, and the cube root of the quotient multiplied by the leſſer extreme, gives the leſſer mean; multiply the ſaid cube root by the leſſer mean, and the product will be the greater mean proportional.

EXAMPLES.

4. What are the two mean Proportionals between 6 and 162? Anſ. 18 and 54.
5. What are the two mean Proportionals between 4 and 108? Anſ. 12 and 36.

To find the ſide of a cube that ſhall be equal in ſolidity to any given ſolid, as a globe, cylinder, priſm, cone, &c.

RULE. The cube root of the ſolid content of any ſolid body given is the ſide of the cube of equal ſolidity.

EXAMPLE.

6. If the ſolid content of a globe is 10648, what is the ſide of a cube of equal ſolidity? Anſ. 22.

The ſide of the cube being given, to find the ſide of that cube, that ſhall be double, treble, &c. in quantity to the given cube.

RULE. Cube the ſide given, and multiply it by 2, 3, &c. the cube root of the product is the ſide ſought.

EXAMPLE.

7. There is a cubical veſſel, whoſe ſide is 12 Inches, and it is required to find the ſide of another veſſel, that is to contain 3 times as much? Anſ. 17,306.

EXTRACTION OF THE BIQUADRATE ROOT.

To extract the Biquadrate Root is to find out a number, which being involved four times into itſelf, will produce the given number.

RULE. Firſt extract the Square Root of the given number, and then extract the Square Root of that Square Root, and it will give the Biquadrate Root required.

EXAMPLES.

1.	What is the biquadrate of 27?	Anſ. 531441
2.	What is the biquadrate of 76?	33362176
3.	What is the biquadrate of 275?	5719140625
4.	What is the biquadrate root of 531441?	27
5.	What is the biquadrate root of 33362176?	76
6.	What is the biquadrate root of 5719140625?	275

A GENERAL RULE

FOR EXTRACTING THE ROOTS OF ALL POWERS.

1. PREPARE the number given for extraction, by pointing off from the units' place, as the root required directs.

2. Find the firſt figure in the root, by the table of powers, which ſubtract from the given number.

3. Bring down the firſt figure in the next point to the remainder, and call it the dividend.

4. Involve the root into the next inferior power to that which is given; multiply it by the given power, and call it the diviſor.

5. Find a quotient figure by common diviſion, and annex it to the root; then involve the whole root into the given power, and call that the ſubtrahend.

6. Subtract that number from as many points of the given power as is brought down, beginning at the loweſt place, and to the remainder bring down the firſt figure of the next point for a new dividend.

7. Find a new diviſor, and proceed in all reſpects as before.

EXAMPLES.

1. What is the ſquare root of 141376?

```
  . . .
141376(379
  9
  ---
 6)51 dividend
  ---
  1369 ſubtrahend.
  ----
 74) 447 dividend.
  ----
 141376 ſubtrahend.
 ------
```

3×2=6 diviſor.
37×37=1369 ſubtrahend.
37×2=74 diviſor.
376×376=141376 ſubtrahend.

Anſ. 379.

2. What is the cube root of 53157376?

```
  . . .
53157376(376
27
---
27)261 dividend.
---
 50653 ſubtrahend.
 -----
4107) 25043 dividend.
 -----
53157376 ſubtrahend.
--------
```

3×3×3=27 diviſor.
37×37×37=50653 ſubtrahend.
37×37×3=4107 diviſor.
376×376×376=53157376 ſubtrahend.

Anſ. 376.

3. What is the biquadrate root of 19987173376?

19987173376(376
81

108)1188 dividend

1874161 ſubtrahend

202612)1245563 dividend

19987173376 ſubtrahend

3 × 3 × 3 × 4 = 108 Diviſor
37 × 37 × 37 × 37 = 1874161 Subtrahend
37 × 37 × 37 × 4 = 202612 Diviſor
376 × 376 × 376 × 376 = 19987173376 Subtrahend. Anſ. 376.

DUODECIMALS.

DUODECIMALS, or Croſs Multiplication, is a rule made uſe of in meaſuring and computing the dimenſions of the ſeveral parts of buildings; it is likewiſe uſed to find ſhips' tonnage and the contents of bales, caſes, &c.

Dimenſions are taken in feet, inches, and parts.

Artificers' work is computed by different meaſures, viz.
Glazing, and maſons' flat work, by the foot;
Painting, paving, plaſtering, &c. by the yard;
Partitioning, flooring, roofing, tiling, &c. by the ſquare of 100 feet;
Brick-work, &c. by the rod of 16½ feet, whoſe ſquare is 272¼.

The contents of bales, caſes, &c. by the ton of 40 Cubic feet.
The tonnage of ſhips, by the ton of 95 feet.

RULE FOR MULTIPLYING DUODECIMALLY.

1. Under the multiplicand write the correſponding denominations of the multiplier.

2. Multiply each term in the multiplicand, (beginning at the loweſt) by the feet in the multiplier; write each reſult under its reſpective term, obſerving to carry an unit from each lower denomination to its ſuperior.

3. In the ſame manner, multiply the multiplicand by the inches in the multiplier, and write the reſult of each term, one place more to the right hand of them, in the multiplicand.

4. Work in the ſame manner with the other parts in the multiplier, ſetting the reſult of each term two places to the right hand of thoſe in the multiplicand, and ſo on for thirds, fourths, &c.

5. Proceed in the like manner with all the reſt of the denominations, and their ſum will give the anſwer required.

EXAMPLES.

1. Multiply 4 feet 9 inches by 8 inches.

4	9
	8
3	2

Anſ. 3 feet 2 inches.

2. Multiply 9 feet 6 inches by 4 feet 9 inches.

	f.	*in.*
	9	6
	4	9
f. in.		
9 6 × 4 feet =	38	0
9 6 × 9 in. =	7	1 6
	45	1 6

Anſ. 45 feet 1 inch and 6 twelfths.

3. What is the price of a marble ſlab, whoſe length is 5 feet 7 inches, and breadth 1 foot 10 inches, at 1 dollar per foot?

Anſ. 10 dols. 23 cts.

4. There is a houſe with three tiers of windows, 3 in a tier, the height of the firſt tier is 7 feet 10 inches, of the ſecond 6 feet 8 inches, and of the third 5 feet 4 inches, and the breadth of each is 3 feet 11 inches; what will the glazing come to, at 14*d.* per foot?

Anſ. £.13 11*s.* 10½*d.*

5. If a houſe meaſures within the walls 52 feet 8 inches in length, and 39 feet 6 inches in breadth, and the roof be of a true pitch, or the rafters ¼ of the breadth of the building, what will it come to, roofing at 10*s.* 6*d.* per ſquare? Anſ. £.12 12*s.* 11¼*d.*

Application of Duodecimals.

To find how many cubic or ſolid ſquare feet (in order to aſcertain the freight) are contained in caſes, bales, &c. that is, how many cubic feet they will take up in a ſhip.

Examples.

1. Suppoſe the dimenſions of a bale to be 7 feet 6 inches, 3 feet 3 inches, and 1 foot 10 inches; what is the ſolid content?

		f.	in.	
		7	6	
		3	3	
f.	in.			
7	6 × 3 ft. =	22	6	
7	6 × 3 in. =	1	10	6
		24	4	6
		1	10	
f.	in. tw.			
24	4 6 × 1 ft. =	24	4	6
24	4 6 × 10 in. =	20	3	9
		44	8	3

Anſ. 44 feet 8 inches and 3 twelfth parts.

2. What is the freight of a bale containing 65 feet 9 inches, at 15 dollars per ton of 40 feet?

		dols. cts.	decimally.
		15,00 for 40 feet.	65,75
20 ft.	$\frac{1}{2}$	7,50	15
5	$\frac{1}{4}$	1,87,5	
6 in.	$\frac{1}{10}$	,18,7	32875
3	$\frac{1}{2}$	,09,3	6575
		24,65,5	40)986,25
			24,65,6

Anſ. 24 dols. 65$\frac{1}{2}$ cts.

3. A merchant imports from London 6 bales of the following dimenſions, viz.

	Length.	Height.	Depth.
	f. in.	*f. in.*	*f. in.*
No. 1.	2 10	2 4	1 9
2.	2 10	2 6	1 3
3.	3 6	2 2	1 8
4.	2 10	2 8	1 9
5.	2 10	2 6	1 9
6.	2 11	2 8	1 8

What are the ſolid contents, and how much will the freight amount to, at 20 dollars per ton?

The contents are viz.

	f.	*in.*
No. 1.	11	7
2.	8	10
3.	12	7
4.	13	2
5.	12	5
6.	13	0
Feet.		
71,58	71	7

20 dols. per ton.

40)1431,60

35,79 Anſ. 35 dols. 79 cts.

To find Ships' Tonnage by Carpenters'-Meaſure.

RULE. For ſingle decked veſſels, multiply the length, breadth at the main beam, and depth of the hold together, and divide the product by 95.

EXAMPLE.

What is the tonnage of a ſingle decked veſſel, whoſe length is 60 feet, breadth 20 feet, and depth 8 feet?

60 length.
20 breadth.

1200
8

95)9600(101$\frac{5}{95}$
95

100
95

5

Anſ. 101$\frac{5}{95}$ tons.

This is the uſual method of tonnaging a ſingle-decked veſſel, having the deck bolted to the wale. But if it be required that the deck be bolted at any height above the wale, the cuſtom is to pay the carpenter for one half of the additional height, to which the deck may be thus raiſed; that is, one half of the difference being added to the former depth, gives the depth to be uſed in calculating the tonnage.

EXAMPLE.

A merchant, after having contracted with a carpenter to build a ſingle-decked veſſel of 60 feet keel, 20 feet beam, and 8 feet hold, deſires that the deck be laid for 10 feet hold; required the tonnage to be paid for.

60 length.
20 breadth.

1200

1 = ½ the diff. of depth + 8 = 9

95)10800(113$\frac{65}{95}$
95

130
95

350
285

65

Anſ. 113$\frac{65}{95}$ tons.

RULE. For a double-decked veſſel, take half the breadth of the main beam for the depth of the hold, and work as for a ſingle-decked veſſel.

EXAMPLES.

1. What is the tonnage of a double-decked veſſel, whoſe length is 65 feet, and breadth 21 feet 6 inches?

65 length.
21 6 breadth.

65
130
65 ft. × 6 in. = 32 6

1397 6
10 9 depth.

f. in.
1397 6 × 10 ft. = 13975 0
1397 6 × 9 in. = 1048 1

15023

95)15023 1(158$\frac{13}{95}$
95

552
475

773
760

13

Anſ. 158$\frac{13}{95}$ tons.

The preceding queſtion may be wrought thus:

```
                65
                21 6
              ------
                65
               130
              ------
6  1/2        1365
                32 6
              ------
               1397 6
                 10 9
              -------
              13975 0
6  1/2          698 9
3  1/2          349 4
              -------
95)15023 1 as before.
   ------
   158 13/95 tons.
```

2. What will the above tonnage amount to, at 16 dollars per ton?

```
158                    dols.
 16                     16
---                    ---
948                     48
158                     16
  2,18                 ---
-----                95)208(2,18
2530,18                190
-------                ---
                       180
                        95
                       ---
                       850
                       760
                       ---
Anſ. 2530 dols. 18 cents.  90
```

3. Required the tonnage of a ſhip of 74 feet keel, and 26 feet 6 inches beam.

Anſ. $273\frac{43}{95}$ tons.

To find the Government Tonnage.

"If the veſſel be double-decked, take the length thereof from the fore part of the main ſtem, to the after part of the ſternpoſt, above the upper deck; the breadth thereof at the broadeſt part above the main wales, half of which breadth ſhall be accounted the depth of ſuch veſſel, and then deduct from the length, three fifths of the breadth, multiply the remainder by the breadth, and the product by the depth, and divide this laſt product by 95, the quotient whereof ſhall be deemed the true contents or tonnage of ſuch ſhip or veſſel; and if ſuch ſhip or veſſel be ſingle-decked, take the length and breadth, as above directed, deduct from the ſaid length three fifths of the breadth, and take the depth from the under ſide of the deck plank, to the ceiling in the hold, then multiply and divide as aforeſaid, and the quotient ſhall be deemed the tonnage."

EXAMPLES.

1. What is the government tonnage of a ſingle-decked veſſel, whoſe length is 69 feet 6 inches, breadth 22 feet 6 inches, and depth 8 feet 6 inches?

	feet	*in.*				
	69	6	length	22	6	breadth
deduct	13	6	for $\frac{3}{5}$ breadth	3		
	56	0		5)67	6	
	22	6	breadth	13	6	
	112	0				
	112					
6 in. $\frac{1}{2}$	28	0				
	1260	0				
	8	6	depth			
	10080	0				
6 in. $\frac{1}{2}$	630	0				
95	10710	0	112$\frac{70}{95}$ tons.			
	95					
	121					
	95					
	261					
	190					
	710					

Anſ. 112$\frac{70}{95}$ tons.

2. What is the government tonnage of a double-decked veſſel, of the following dimenſions, length 75 feet 6 inches, breadth 23 feet 4 inches, and depth 11 feet 8 inches?

	feet	*in.*	
	75	6	
	14	0	for $\frac{2}{5}$ breadth
	61	6	
	23	4	breadth
	183		
	122		
6 in. $\frac{1}{2}$	11	6	
4 in. $\frac{1}{3}$	20	6	
	1435	0	
	11	8	depth
	15785	0	
6 in. $\frac{1}{2}$	717	6	
2 in. $\frac{1}{3}$	239	2	

95)16741 8(176$\frac{2}{5}$ tons.
95

724
665

591
57●

21

Or,

	feet	*in.*
	75	6
	14	0
	61	6
	23	4
61 f. × 23 f. =	1403	0
6 in. × 23 f. =	11	6
61 f. 6 in. × 4 in. =	20	6
	1435	0
	11	8
	15785	
1435 f. × 8 in. =	956	8
	16741	8 as before.

Anſ. 176$\frac{2}{5}$ tons.

3. What is the government tonnage of a double-decked veſſel, of the following dimenſions, length 82 feet 3 inches, breadth 24 feet 3 inches, and depth 12 feet 1$\frac{1}{2}$ inches?

Anſ. 209$\frac{63}{95}$ tons.

TABLES OF CORDAGE.

A Cordage Table, ſhewing how many fathoms, feet, and inches of a rope of any ſize, not more than 14 inches, make a hundred weight: with the uſe of the table.

Inches.	Fathoms.	Feet.	Inches.	Inches.	Fathoms.	Feet.	Inches.	Inches.	Fathoms.	Feet.	Inches.	Inches.	Fathoms.	Feet.	Inches.
1	486	0	0	4¼	26	5	3	7½	8	4	0	10¾	4	1	8
1¼	313	3	0	4½	24	0	0	7¾	8	3	6	11	4	0	3
1½	216	3	0	4¾	21	3	0	8	7	3	6	11¼	3	5	7
1¾	159	3	0	5	19	3	0	8¼	7	0	8	11½	3	4	1
2	124	3	0	5¼	17	4	0	8½	6	4	3	11¾	3	3	3
2¼	96	2	0	5½	16	1	0	8¾	6	2	1	12	3	2	3
2½	77	3	0	5¾	14	4	6	9	6	0	0	12¼	3	2	1
2¾	65	4	0	6	13	3	0	9¼	5	4	0	12½	3	2	0
3	54	0	0	6¼	12	2	0	9½	5	2	0	12¾	2	7	8
3¼	45	5	2	6½	11	3	0	9¾	5	0	6	13	2	5	3
3½	39	3	0	6¾	10	4	0	10	4	5	0	13¼	2	4	9
3¾	34	3	9	7	9	5	6	10¼	4	4	1	13½	2	4	0
4	30	1	6	7¼	9	1	6	10½	4	2	2	13¾	2	3	6
												14	2	2	1

USE OF THE TABLE.

At the top of the table, marked inches, fathoms, feet, inches, the firſt column is the thickneſs of the rope in inches and quarters, and the other three the fathoms, feet, and inches that make up a hundred weight of ſuch a rope. One example will make it plain.

Suppoſe you deſire to know how much of a ſeven-inch rope will make a hundred weight: Find 7 in the third column under inches, or thickneſs of rope, and againſt it in the fourth column you find 9 5 6, which ſhews that there will be 9 fathoms 5 feet 6 inches required to make one hundred weight.

A Table ſhewing the weight of any Cable or Rope, of 120 fathoms in length, and for every half inch, from 3 to 24 inches in circumference.

Inches.	Cwt.	Qrs.	Inches.	Cwt.	Qrs.	Inches.	Cwt.	Qrs.	Inches.	Cwt.	Qrs.	Inches.	Cwt.	Qrs.
3	2	1	7	12	1	11	30	1	15½	60	0	20	100	0
3½	3	0	7½	14	0	11½	33	0	16	64	0	20½	105	0
4	4	0	8	16	0	12	36	0	16½	68	0	21	110	1
4½	5	0	8½	18	0	12½	39	0	17	72	1	21½	115	2
5	6	1	9	20	1	13	42	1	17½	76	2	22	121	0
5½	7	2	9½	22	2	13½	45	2	18	81	0	22½	126	2
6	9	0	10	25	0	14	49	0	18½	85	2	23	132	1
6½	10	2	10½	27	2	14½	52	2	19	90	1	23½	138	0
						15	56	1	19½	95	0	24	144	0

Use of the Table.

The firſt column marked for inches, is the thickneſs or circumference of the cable to every half inch from 3 to 24 inches; the ſecond, marked Cwt. qrs. for the hundred weights and quarters that it will weigh if 120 fathoms in length.

For inſtance: Suppoſe it be a cable of 14½ inches; look againſt 14½ and you will find in the other column 52 cwt. 2 qrs, which ſhews that 120 fathoms of 14½ inch cable will weigh 52 cwt. 2 qrs. and ſo in others: and any quantity of a leſs length will weigh in proportion.

A ſhip was brought to anchor in a gale of wind, but the gale increaſing, it was thought ſafeſt to cut the cables, in conſequence of which 75 fathoms of 16 inches and 50 fathoms of 12 inches were loſt; what muſt they be valued at in calculating the average; new cordage being then 14 dollars per cwt?

Calculation.

120 fath. 16 in. cable=64 cwt. 120 fath. 12 in. cable=36 cwt.

60	do.	32	40	do.	12
15	do.	8	10	do.	3
75 fath. weighing		40	50 fath. weighing		15
50	do.	15			

	dols.	cts.
55 cwt. at 14 dols. per cwt.	770	00
One third deducted for new	256	66⅔
Anſ. dols.	513	33⅓

MONEY OF FRANCE.

[*The following information was procured too late to be inserted in its proper place.*]

The preſent money of account in France is in Francs and Centimes or hundredths.

In November, 1800, an Engliſh guinea was worth 25 fr. 75 cent,
A Spaniſh dollar . . . 5 do. 53 do.

To change francs to livres tournois.

RULE. Multiply the francs by 81 and divide by 80 for livres.

EXAMPLE.

Change 3756 francs to livres.

```
  3756
    81
  ----
  3756
 30048
 -----
80)30423,6
 -----
 3802 76
    20
  ----
80)152,0
 -----
   19        Anſ. 3802 liv. 19 ſols.
```

To change livres tournois to francs.

RULE. Multiply the livres by 80, and divide the product by 81 for francs.

EXAMPLE.

Change 5469 livres to francs.

5469
80

81)437520(5401,43
405

325
324

120
81

390
324

260
243

17 Anſ. 5401 fr. 43 cen.

To change ſols and deniers to centimes.

RULE. Take one half of the ſols and deniers, as if they were integers; this half is the number of centimes required.

EXAMPLES.

	sol.	*den.*	*sol.*	*den.*	*sol.*	*den.*	*sol.*	*den.*	
Change	4	6	12	2	6	8	16	6	to centimes.
Anſ.		23		61		34		83	centimes.

When there is a remainder in dividing the ſols, it is to be carried to the deniers, and reckoned 10 and not 12; add this 10 to the deniers, and take one half of the ſum for the remaining centime.

EXAMPLES.

	sol.	*den.*	*sol.*	*den.*	*sol.*	*den.*	
Reduce	5	8	15	4	19	6	to centimes.
Anſ.		29		77		98	centimes.

If the number of deniers be 10 or 11, they are to be rejected, a in place of them you are to add 1 to the number of ſols precedin and then annex a cypher to it; one half of this is the centimes r quired.

EXAMPLES.

	sol.	*den.*		*sol.*	*den.*		*sol.*	*den.*	
Change	1	10		7	11	and	15	10	to centimes.
	2)20			2)80			2)160		
Anſ.	10			40			80		centimes.

Sols and deniers are reduced to centimes by the preceding rul and though the reſult is not accurate, yet from its ſimplicity and co ciſeneſs it is generally uſed.

TABLES

For changing Livres, Sols, and Deniers to Francs and Centimes.

[*N.B. The firſt is ſufficiently exact for buſineſs; in the ſecond th anſwer is calculated to the ten-thouſandth part of a centime.*]

Deniers.	Tab. I. Fr.	Cent.	Tab. II. Fr.	Cent.	ten thouſandths of a centime.
1	0	0	0	0	4115
2	0	1	0	0	8230
3	0	1	0	1	2346
4	0	2	0	1	6461
5	0	2	0	2	0576
6	0	2	0	2	4691
7	0	3	0	2	8807
8	0	3	0	3	2922
9	0	4	0	3	7037
10	0	4	0	4	1152
11	0	5	0	4	5267
Sols.					
1	0	5	0	4	9383
2	0	10	0	9	8765
3	0	15	0	14	8148
4	0	20	0	19	7531
5	0	25	0	24	6914
6	0	30	0	29	6296
7	0	35	0	34	5679
8	0	40	0	39	5062

Sols.	Fr.	Cent.	Fr.	Cent.	ten thousandths of a centime.
9	0	44	0	44	4444
10	0	49	0	49	3827
11	0	54	0	54	3210
12	0	59	0	59	2593
13	0	64	0	64	1975
14	0	69	0	69	1358
15	0	74	0	74	0741
16	0	79	0	79	0123
17	0	84	0	83	9506
18	0	89	0	88	8889
19	0	94	0	93	8272
Livres.					
1	0	99	0	98	7654
2	1	98	1	97	5309
3	2	96	2	96	2963
4	3	95	3	95	0617
5	4	94	4	93	8272
6	5	93	5	92	5926
7	6	91	6	91	3580
8	7	90	7	90	1235
9	8	89	8	88	8889
10	9	88	9	87	6543
12	11	85	11	85	1852
15	14	81	14	81	4815
20	19	75	19	75	3086
24	23	70	23	70	3704
30	29	63	29	62	9630
40	39	51	39	50	6173
50	49	38	49	38	2716
60	59	26	59	25	9259
70	69	14	69	13	5803
72	71	11	71	11	1111
80	79	01	79	01	2346
90	88	89	88	88	8889
96	94	81	94	81	4815
100	98	77	98	76	5432
200	197	53	197	53	0864
300	296	30	296	29	6297
400	395	06	395	06	1729
500	493	83	493	82	7161
1000	987	65	987	65	4322
5000	4938	27	4938	27	1608
10000	9876	54	9876	54	3217

A TABLE

For reducing Francs and Centimes to Livres, Sols, and Deniers.

Cent.	sol.	den.	hundredths of den.
1	0	2	43
2	0	4	86
3	0	7	29
4	0	9	72
5	1	0	15
10	2	0	30
15	3	0	45
20	4	0	60
25	5	0	75
30	6	0	90
35	7	1	05
40	8	1	20
45	9	1	35
50	10	1	50
55	11	1	65
60	12	1	80
65	13	1	95
70	14	2	10
75	15	2	25
80	16	2	40
85	17	2	55
90	18	2	70
95	19	2	85

Francs.	liv.	sol.	den.
1	1	0	3

Francs.	liv.	sol.	den.
2	2	0	6
3	3	0	9
4	4	1	0
5	5	1	3
6	6	1	6
7	7	1	9
8	8	2	0
9	9	2	3
10	10	2	6
15	15	3	9
20	20	5	0
30	30	7	6
40	40	10	0
50	50	12	6
60	60	15	0
70	70	17	6
80	81	0	0
90	91	2	6
100	101	5	0
200	202	10	0
300	303	15	0
400	405	0	0
500	506	5	0
1000	1012	10	0
5000	5062	10	0
10000	10125	0	0

A TABLE

For receiving and paying the Gold Coins of FRANCE *and* SPAIN, *at* 100 *cents for* $27\frac{2}{5}$ *grains, according to the Act of Congress.*

grains.	dol.	cts.	137ths of a ct.
1	0	3	89
2	0	7	41
3	0	10	130
4	0	14	82
5	0	18	34
6	0	21	123
7	0	25	75
8	0	29	27
9	0	32	116
10	0	36	68
11	0	40	20
12	0	43	109
13	0	47	61
14	0	51	13
15	0	54	102
16	0	58	54
17	0	62	6
18	0	65	95
19	0	69	47
20	0	72	136
21	0	76	88
22	0	80	40
23	0	83	129
24	0	87	81
dwt.			
1	0	87	81
2	1	75	25
3	2	62	106
4	3	50	50
5	4	37	131
6	5	25	75
7	6	13	19
8	7	0	100
9	7	88	44
10	8	75	125
11	9	63	69

dwt.	dol.	cts.	137ths of a ct.
12	10	51	13
13	11	38	94
14	12	26	38
15	13	13	119
16	14	1	63
17	14	89	7
18	15	76	88
19	16	60	32
20	17	51	113
ounces.			
1	17	51	113
2	35	3	89
3	52	55	65
4	70	7	41
5	87	59	17
6	105	10	130
7	122	62	106
8	140	14	82
9	157	66	58
10	175	18	34
11	192	70	10
12	210	21	123
13	227	73	99
14	245	25	75
15	262	77	51
16	280	29	27
17	297	81	3
18	315	32	116
19	332	84	92
20	350	36	68
21	367	88	44
22	385	40	20
23	402	91	131
24	420	43	109
25	437	95	85
26	455	47	61

ounces.	dol.	cts.	137ths of a ct.
27	472	99	37
28	490	51	13
29	508	2	126
30	525	54	102
31	543	6	78
32	560	58	54
33	578	10	30
34	595	62	6
35	613	13	119
36	630	65	95
37	648	17	71
38	665	69	47
39	683	21	23
40	700	72	136
41	718	24	112
42	735	76	88
43	753	28	64
44	770	80	40
45	788	32	16
46	805	83	129
47	823	35	105
48	840	87	81
49	858	39	57
50	875	91	33
51	893	43	9
52	910	94	122
53	928	46	98
54	945	98	74
55	963	50	50
56	981	2	26
57	998	54	2
58	1016	5	115
59	1033	57	91
60	1051	9	67
61	1068	61	43
62	1086	13	19

A TABLE

For receiving and paying the Gold Coins of GREAT-BRITAIN *and* PORTUGAL, *at* 100 *cents for* 27 *grains, according to Act of Congress.*

grs.	dol.	cts	27ths of a ct.
1	0	3	19
2	0	7	11
3	0	11	3
4	0	14	22
5	0	18	14
6	0	22	6
7	0	25	25
8	0	29	17
9	0	33	9
10	0	37	1
11	0	40	20
12	0	44	12
13	0	48	4
14	0	51	23
15	0	55	15
16	0	59	7
17	0	62	26
18	0	66	18
19	0	70	10
20	0	74	2
21	0	77	21
22	0	81	13
23	0	85	5
24	0	88	24

dwt.	dol.	cts.	9ths of a ct.
1	0	88	8
2	1	77	7
3	2	66	6
4	3	55	5
5	4	44	4
6	5	33	3
7	6	22	2
8	7	11	1
9	8	00	0
10	8	88	8
11	9	77	7
12	10	66	6
13	11	55	5
14	12	44	4
15	13	33	3
16	14	22	2
17	15	11	1
18	16	00	0
19	16	88	8
20	17	77	7

ounces.	dol.	cts.	9ths of a ct
1	17	77	7
2	35	55	5
3	53	33	3
4	71	11	1
5	88	88	8
6	106	66	6
7	124	44	4
8	142	22	2
9	160	00	0
10	177	77	7
11	195	55	5
12	213	33	3
13	231	11	1
14	248	88	8
15	266	66	6
16	284	44	4
17	302	22	2
18	320	00	0
19	337	77	7
20	355	55	5
21	373	33	3
22	391	11	1
23	408	88	8
24	426	66	6
25	444	44	4
26	462	22	2
27	480	00	0

oz.	dol.	cts	9ths of a ct.
28	497	77	7
29	515	55	5
30	533	33	3
31	551	11	1
32	568	88	8
33	586	66	6
34	604	44	4
35	622	22	2
36	640	00	0
37	657	77	7
38	675	55	5
39	693	33	3
40	711	11	1
41	728	88	8
42	746	66	6
43	764	44	4
44	782	22	2
45	800	00	0
46	817	77	7
47	835	55	5
48	853	33	3
49	871	11	1
50	888	88	8
51	906	66	6
52	924	44	4
53	942	22	2
54	960	00	0
55	977	77	7
56	995	55	5
57	1013	33	3
58	1031	11	1
59	1048	88	8
60	1066	66	6
61	1084	44	4
62	1102	22	2
63	1120	00	0
64	1137	77	7

MERCANTILE PRECEDENTS.

Note, the following bill of Exchange was wrongly drawn: it should not have been received

BILL OF EXCHANGE.

Newburyport, Feb. 12, 1800.

EXCHANGE for £.1000 ſterling.

At twenty days ſight of this my firſt of exchange (ſecond and third of the ſame tenor and date not paid) pay to John Parker, or order, One Thouſand Pounds Sterling, with or without further advice from

Your humble ſervant,

WILLIAM PRINCE.

Meſſ. DUTTON & GREEN,
Merchants,
LONDON.

BILL OF GOODS, at an advance on the ſterling caſt.

Boſton, May 5, 1800.

Mr. William Poole

Bo't of Simon Simmonds.

32 ells mode	1s. 8d. ſterl.	£.2	13	4	
64 yds. ſtriped Nankins	1s. 6d.	4	16	0	
28 .. ſtriped calico	1s. 9d.	2	9	9	
4 pieces ruſſel	24s.	4	16	0	
	Sterl.	14	14	4	
	Exchange 33⅓ per cent.	4	18	1⅓	
	£.	19	12	5⅓	
	Advance at 20 per cent.	3	18	5⅓	
	£.	23	10	11	
	Dollars	78,48			

Received his note at 2 months,

Simon Simmonds.

PROMISSORY NOTE.

Boſton, May 5, 1800. For value received, I promiſe to pay to Simon Simmonds, or order, Seventy-eight dollars forty-eight cents, on demand, with intereſt after two months.

Atteſt, *William Poole.*

Saul James.

A RECEIPT FOR AN ENDORSEMENT ON A NOTE.

Boſton, July 12, 1800. Received from Mr. William Poole, (by the hands of Mr. Benjamin Flint,) Thirty eight dollars ſeventy cents, which is endorſed on his note of May 5, 1800.

Simon Simmonds.

38 dols. 70 cts.

RECEIPT FOR MONEY RECEIVED ON ACCOUNT.

Boſton, January 10, 1800. Received from Mr. D. Evans. by the hands of Mr. Thomas Dunmore, Four hundred and thirty dollars on account.

430 dols. *George Pace.*

PROMISSORY NOTE BY TWO PERSONS.

Newburyport, 12th July, 1800. For value received we jointly and ſeverally promiſe to pay to Mr. Samuel Rich, or order, five hundred dollars fifty four cents on demand, with intereſt.

Atteſt, *Nathan Sayborn.*

William Bolton. *Stephen Needy.*

GENERAL RECEIPT.

New-Bedford, March 27, 1800.

Received from Mr. *N. B.* the ſum of ten dollars twenty-nine cents in full of all demands.

10 dols. 29 *E. D.*

BILL OF PARCELS.

Newburyport, June 20. 1800.

Mr. William Holman

Bought of Daniel Green,

8 hhd. ſugar, wt. *viz.*

	C.	*q.*	*lb.*		*C.*	*q.*	*lb.*
No. 1	5	2	7	5	5	3	19
2	5	1	22	6	5	1	17
3	6	0	13	7	5	1	7
4	5	2	13	8	5	3	14
	22	2	27		22	2	1
	22	2	1				
	45	1	0				
Tare 12 pr cwt.	4	3	11				

			dols.	*cts.*
Neat	40 1 17	at 12 dols. per cwt. . .	484	82

2 bbls. ſugar, *viz.*

C.	*q.*	*lb.*
2	2	25
1	3	17
4	2	14
Tare 21 lb. pr bbl.	1	14

Neat	4 1 0	at 10 dols.	42	50

3 hhd. molaſſes, *viz.*

gals.
101—9*
108—5
107—7
316—21
21
295 gallons at 50 cents	147	50
1 quarter caſk Malaga wine	25	00
5 caſes gin, at 4 dols. 25 cents	21	25
Dols.	721	07

* The ullage is thus noted.

INVOICES.

INVOICE of 20 hhd. clayed ſugar and 10 hhd. coffee, ſhipped by of Boſton in the United States of America, on his own account and riſque, on board the ſhip.....A. B. maſter, bound for.....and a market, conſigned to the ſaid A. B. for ſales and returns, *viz.*

20 hhds clayed ſugar, wt. *viz.*

B. C.		C.	q.	lb.		C.	q.	lb.
No. 1 *a* 20	No. 1	11	3	14	11	12	0	14
	2	10	3	21	12	10	2	14
	3	11	0	0	13	10	2	21
	4	12	1	0	14	11	3	21
	5	11	1	14	15	10	1	14
	6	10	3	7	16	10	2	0
	7	10	2	0	17	11	2	21
	8	11	0	7	18	10	1	14
	9	11	0	21	19	11	1	7
	10	10	0	7	20	10	3	14
		111	0	7		110	2	0
		110	2	0				
		221	2	7				
Tare 12 per cwt.		23	2	27				
		197	3	8	neat at 16 dols. 25 cts.			*dols. cts.* 2027 67

10 hhds coffee, wt. *viz.*

B. C.	No.	C.	q.	lb.	Tare	No.	C.	q.	lb.	Tare
No. 1 *a* 10	1	9	2	7	108	6	6	1	14	79
	2	9	3	0	112	7	6	1	6	61
	3	10	1	21	106	8	8	2	4	84
	4	10	2	14	103	9	9	1	8	91
	5	8	0	14	94	10	10	0	14	108
		48	2	0	523		40	2	18	423
		40	2	18	423					
					946					
		89	0	18 = 9986 lb.						
	deduct tare				946					
					9040 lb. neat at 21 cts.					1898 40
										3926 07
Premium of inſuring 4176 dols. 67 cts. at 6 per cent. to cover the amount, . . .										250 60
										dols. 4176 67

Boſton, &c.

INVOICE.

INVOICE of Merchandize on board the brig Swan, A. B. maſter, ſhipped by A. M. on his own account and riſque, for the Weſt-Indies, and conſigned to ſaid maſter for ſales and returns, *viz.*

	140 M. of boards and plank	dols. 10	dols. 1400	
	20 M. of white-oak hhd. ſtaves	30	600	
	12 M. of red-oak hhd. do. .	12	144	
	130 M. of ſhingles	3	390	
B.No.1–18.	18 hhd. of cod-fiſh, 17303 lb. .	4 per C.	692	12
B.No.1–52.	52 bbls. of beef	12	624	
E.No.1–30.	30 bbls. of ſalmon	10	300	
F.No.1--2.	2 bbls. of pork	18	36	
L.No.1--7.	7 caſks of rice, neat 39 C. 3 qr. 21 lb.	4 pr cwt	159	75
	3 M. of hoops	25	75	
	1300 pairs of ſhoes	50cts.	650	
		Dols.	5070	87

Portſmouth, Sept. 7, 1798.

Errors excepted.

A. M.

Mr. Abraham Jones to Walter Brown . . Dr.

1799.				
Jan. 5.	For 1 barrel of flour	Dols. 10	..	
8.	4 lb. of coffee 2*s.* . . .	1	33	
9.	9 lb. of ſugar 11*d.* .	1	37	
23.	7 gallons molaſſes . . . 3*s.* 9*d.* . .	4	37	
Feb. 7.	3 quintals fiſh 15*s.* . . .	7	50	
16.	2 lb. hyſon tea 8*s.* 6*d.* . .	2	83	
Mar. 29.	5 lb. chocolate 1*s.* 6*d.* . .	1	25	
May 5.	2 buſhels of corn . . . 4*s.* 9*d.* . .	1	58	
		Dols.	30	23

Errors excepted.

ACCOUNTS OF SALES.

SALES of twenty hogſheads, ſeven barrels, and thirty-one bags coffee, for and on riſk of Mr. William Stillman, merchant in Portland.

1798				
March 15	William Edes	20 hhds. wt. 14376 lb. at 23 cts. per lb.	Dols.	3306 48
16	George Watts	7 bls. wt. 1493 at 23 cts.		343 39
17	Peter Bates	31 bags 5507 23		1266 61
				4916 48
Charges,				
Advertiſing			Dols. 1 46	
Storage			3 50	
Commiſſion on 4916 dols. 48 cts. at 2½ per ct.			122 91	127 87
		Neat proceeds paſſed to his credit	Dols.	4788 61
		Errors excepted, &c.		

SALES of ſundry merchandize received per the ſhip Juno, Capt. Dane, from Machias, and diſpoſed of for account and riſk of Amos Goodwin, merchant there.

Date.	To whom ſold.	quintals fiſh	barrels oil	barrels ſalmon	barrels herring	cords wood	cords bark	feet boards	barrels beef	Price	Amount
1797										Dols	dlls. cts
June 4	James Yates	30								3	90
8	William Rowe	120								3.27	392 40
27	John Payſon		6							12	72
July 4	James Nugent						22			4	88
"	Caſh			50						S.75	487 50
8	Simon Sands							3,216		6.50	209 00
21	Stock								15	9	135
29	Paul Simſon					13				3.50	45 50
Aug. 5	Jona. Roſe							1,259		6	75 55
	Taken to fill up		1								
		150	7	50		13	22	4,475	15		1288 85

Remaining unſold, 40 barrels herring.

Charges, viz.

Storage of fiſh	Dols.	10 50	
Commiſſion on 1283 dols. 85 cts. at 2½ pr. ct.		32 22	42 72
Neat proceeds carried to the credit of his account,	Dols.		1246 13
Errors excepted, &c.			

SALES of nineteen hogſheads and ſeven barrels of rum, received per the ſchooner Ruby, Richard Butler maſter, from Portſmouth, for account and riſque of Daniel Edwards, merchant there.

Date.	To whom ſold.	19 hhds. Rum.	7 bbls. Rum.	Gallons.	Price.	Contents.	Amount	
1798					*Cts.*		*dls.*	*cts.*
May 24	By Walter King		1	29½	100		29	50
June 2	By David Jones	2		216	100	110 and 106	216	
20	By James Ray	4		438	96	108,110,111,109	420	48
24	By Aaron Judſon		3	81	95	26½, 27½, 27	76	95
July 23	By Thomas Ropes	1		115	95½		109	82
Aug. 3	By Parſons & Ely		1	25	95½		23	87
23	By Simon Sands	2		222	98	109, 113	217	56
Sept. 4	By Miles Young	1	1	138	96	110, 28	132	48
10	By Moſes Bliſs	3	1	342½	99	107,104,103.28½	339	7
25	By Amos Dundas	6		632	98½	109,102,106 111, 112, 92	622	52
		19	7	2239				
							2188	25

Charges.

	dols.	*cts.*	*dols.*	*cts.*
Paid Capt. Butler freight of 19 hhds. Rum, at	2	50	47	50
ditto 7 bbls. - -		66	4	62
Porterage 19 hhds. - - - - - - - -		40	7	60
ditto 7 bbls. - - - - - - - - -		10		70
Gauging 26 caſks - - - - - - - - -		12½	3	25
Cooperage 3 dols. on hhds. 1 dol 50 cts. on bbls.			4	50
Adverti ſing - - - - - - - - - - -			1	25
Commiſſion on 2188 dols. 25 cts. at 5 per ct.			109	41
			178	83
Neat proceeds . Dols.			2009	42

Outſtanding in hands of

	Dols.	*cts.*
Arthur Rawſon,	339	7
William Dundas,	622	52

Boſton, 25th September, 1798.

Errors excepted, &c.

SALES of the Ship Hiram's Cargo, by William Sutton.

1794.		lb.		liv.	sol.	den.	liv.	sol.	den.
May 24.	65 hhd. fish, wt. nt.	72587	at 33 liv. per 100,	23953	14	2			
	6 do. do.	6515	32	2084	16	0			
	2 do. do.	2136	31	662	3	2			
	34 do. do.	36658	30	10997	8	0			
	2 do. partly damged	2184	sold at auction for	226	0	0			
	109						37924	1	4
		liv. sol. den.							
	24 bbls. beef	at 101 1 3	per bbl.	2425	10	0			
	7 do. do.	99 8 5		695	18	11			
	29 do. do.	90 15 0		2631	15	0			
	4 do. do.	83 0 0		332	0	0			
	64						6085	3	11
		liv. sol.							
	13 do. pork	136 0		1768	0	0			
	25 do. porter	80 0		2000	0	0			
	3 boxes linen, cont. 169 piec.	96 0	per piece,	16224	0	0			
	14 firkins butter, wt. 1129 lb.	2 5	per lb.	2540	5	0			
	5 thousand hoops	240	per M.	1200	0	0			
	59 do. shingles	16	do.	944	0	0			
	159149 feet boards	120	do.	1913	17	7			
	170 shaken hhds.	8¼	per hhd.	1402	10	0			
							27992	12	7
		liv. s. d.					72001	17	10
	Commission on	72001 17 10	at 5 per cent.				3600	1	10
				Liv.			68401	16	0

Errors excepted, &c.

Disbursements, Duties, &c. paid on Ship Hiram, by Wm. Sutton.

1794.		liv.	s.	d.	liv.	s.	d.
May 18.	Paid for a barrel of flour	86	10	0			
	.. to the admiralty	240	11	6			
	.. for fresh meat	56	12	5			
	.. for flats to unload with	341	13	6			
					725	7	5
	Paid to the harbour master	66	10	4			
	.. for storage and negro hire	619	14	8			
	.. for inward duties	714	11	7			
	.. for outward duties	229	13	5			
					1630	10	0
	Paid for brokerage	821	13	6			
	.. for passport and certificate	68	19	7			
					890	13	1
				Liv.	3246	10	6

Point-Petre, Guadaloupe, July 12, 1794.

Errors excepted,

WM. SUTTON.

Dr. *Mr. William Cummins, as owner of the Ship Hiram, in account with William Sutton.* *Cr.*

1794.	hhd.		lb.		liv.	lb.	liv.	s.	d.	liv.	s.	d.
June 12. To 24 sugar wt. nt.			35343	at 58 per	100,		20498	18	9			
	7	do.	9055	42			3803	2	0			
	12	do.	19783	43			8592	13	9			
	43		64381							32894	14	6
			fol.	d.								
To 4856 lb. coffee		at	22	6	per lb.		5463	0	0			
2019	do.		23				2321	17	0			
6523	do.		23	6			7664	10	6			
5247	do.		24				6296	8	0			
18645 in 20 hhds. and 6 barrels										21745	15	6
To 19 bales cotton 4645 lb. at 140 liv per. 100,							6503	0	0			
To 2661 veits of molasses . 24 fols per velt,							3193	4	0			
	liv.	s.	d.							9696	4	0
To commission on 64336 6 4 at 2½ per cent										1608	8	4
To amount of disbursements, duties, &c. per account annexed										3246	10	6
										69191	12	10
Balance in cash on board,										960	3	2
					Livres					70151	16	0

1794.	liv.	s.	d.
June 10. By neat proceeds of Ship Hiram's cargo, per account of sales annexed	68401	16	0
By cash brought out	1750	0	0
Livres	70151	16	0

Point-Petre, Guadaloupe, July 12, 1794.
Errors excepted.
WILLIAM SUTTON.

Dr. *Mr. John Johnson in account current with William Roberts.* *Cr.*

1798.		dols.	c.
May 19.	To cash advanced per receipt	300	
June 5.	To furniture per bill	468	18
July 29.	To payment of his order to M. B. for	100	
29.	To 1 bag coffee, 96 lb. at 20 cts.	19	20
Aug. 1.	To cash per receipt	150	
"	To 5 hhd. rum, 555 gallons at 83½ cts.	462	50
"	To 3 boxes glass, 7 by 9 . 10 dols.	30	
Sept. 8.	To sundries per bill	228	56
"	To cash per receipt	985	
20.	To 1 bl. flour, at 8 dols. 4 bl. pork, at 12 dols.	144	
25.	To 1 hhd. sugar, 8 cwt. 2 qrs. 7 lb. nt. 10 dols.	85	62
Oct. 29.	To cash and sundries in full	81	
	Dols.	2744	

1798.		dols.	cts.
Oct. 28.	By ship Columbia, for hull thereof complete, being 171½ tons, at 16 dols.	2744	
	Dols.	2744	

Salem, October 28, 1798.

Errors excepted,

WILLIAM ROBERTS.

Dr. *Meſſ. Wilſon & Gale in account current with William Duncan.* *Cr.*

1798.			dols.	cts.
May 19.	To 1 barrel flour . .	delivered Wilſon	9	50
28.	To caſh	Gale	28	50
June 22.	To 15 lb. butter 15*s.* tea 6*s.* .	Wilſon	8	50
29.	To 3 quintals ſcale fiſh, at 15*s.* .	Gale	7	50
July 2.	To 1 half barrel flour	do.	5	
15.	To 12 lb. coffee 18*s.* 28 lb. ſugar 25*s.* 6*d.*	do.	7	25
20.	To caſh	Wilſon	25	
26.	To 15 buſhels corn, at 5*s.* . . .	Gale	12	50
Aug. 2.	To 8 do. rye, at 6*s.* . . .	Wilſon	8	
	To paid their order to James Rowe . . .		12	50
		Dols.	119	25

1798.		dols.	ct.
Sept. 10.	By amount of their account for repairs on the ſhip America	119	25
	Dols.	119	25

Newburyport, 27th September, 1798.
Errors excepted.
For Mr. WILLIAM DUNCAN,
SAMUEL TRUSTY.

Dr. *Mr. James Richardson in account current with Thomas Seccome.* *Cr.*

1798		dols. cts	1798		dols. cts
June 12.	To sundries per bill	28 26	Nov. 12.	By schooner William for blacksmith's work per bill, viz. 6325 lb. at 6 cents . . 759 lb. tare at 12 per cent.	379 50
	To 53 bars iron, wt. 21 2 10 for schr. William			7084 lb. supplied per Dr.	
July 16.	To 121 do. . 41 2 18 do. do.				
26.	To 1 hhd. W. I. Rum qt. 107 gals. at 96 cts.	102 72			
Aug. 28.	To cash per receipt	180 00			
29.	To 4 bbls. flour at 9 dols. 50 cents	38 00			
Sept. 21.	To cash paid his order to James Wise	28 00			
	To cash in full	2 52			
		dols. 379 50			dols. 379 50

Note. When a person is furnished with his account current, it is necessary to specify the various charges, and when they are numerous, some accountants make but one charge of them, in the account current, referring to an annexed account of the several articles thus included.

Newburyport, 12th November, 1798.

Errors Excepted,

THOMAS SECCOME.

BILL OF SALE.

TO all people to whom this preſent Bill of Sale ſhall come, I R. P. of Newburyport, in the ſtate of Maſſachuſetts, Merchant, ſend Greeting; KNOW YE, That I the ſaid R. P. for and in conſideration of the ſum of *Three thouſand, two hundred and twenty-two dollars*, to me in hand well and truly paid at or before the enſealing and delivery of theſe preſents, by S. T. of the ſaid Newburyport, Merchant, the receipt whereof I do hereby acknowledge and am therewith fully and entirely ſatisfied and contented, have granted, bargained and ſold, and by theſe preſents do grant, bargain and ſell, unto the ſaid S. T. all the hull or body of the good brig Sally, together with all and ſingular her maſts, ſpars, ſails, rigging, cables, anchors, boats, and appurtenances, now lying at Newburyport, and regiſtered at the port of Newburyport, the certificate of whoſe regiſtry is as follows:

IN purſuance of an act of the Congreſs of the United States of America entitled, "AN ACT concerning the regiſtering and recording of ſhips or veſſels, R. P. of Newburyport, in the State of Maſſachuſetts, Merchant, having taken or ſubſcribed the oath required by the ſaid act, and having ſworn that he is the only owner of the ſhip or veſſel called the Sally, of Newburyport, whereof William Knapp is at preſent maſter, and is a citizen of the United States, as he hath ſworn, and that the ſaid ſhip or veſſel was built at Saliſbury, in the ſaid State, in the year ſeventeen hundred & ninety-nine, as alſo appears by a certificate of enrolment, No. 129, iſſued in this diſtrict on the fourth day of Auguſt laſt, now ſurrendered—and N. S. ſurveyor of this diſtrict, having certified that the ſaid ſhip or veſſel has one deck and two maſts, and that her length is ſixty-nine feet five inches, her breadth twenty-two feet and one half inch, her depth eight feet two inches, and that ſhe meaſures one hundred and ſix tons and forty ninety-fifths, that ſhe is a ſquare-ſtern'd brig, has no galleries and no figure head—and the ſaid R. P. having agreed to the deſcription and admeaſurement above ſpecified, and ſufficient ſecurity having been given according to the ſaid act, the ſaid brig has been duly regiſtered at the port of Newburyport.

Given under my hand and ſeal at the port of Newburyport, this firſt day of January, in the year one thouſand eight hundred.

To have and to hold the ſaid granted and bargained brig Sally and premiſes with the appurtenances, unto the ſaid S. T. his heirs, executors, adminiſtrators or aſſigns to his only proper uſe, benefit and behoof for ever. And I the ſaid R. P. do avouch myſelf to be the true and lawful owner of the ſaid brig and appurtenances, and have in myſelf full power, good right and lawful authority to diſpoſe of the ſaid brig as aforeſaid, and her appurtenances in manner as aforeſaid, and furthermore I the ſaid R. P. do hereby covenant and agree to warrant and defend the ſaid brig and premiſes, with the appurtenances againſt the lawful claims and demands of all perſons whatſoever unto the ſaid S. T. In witneſs whereof, I the ſaid R. P. have hereunto ſet my hand and ſeal, this tenth day of June, in the year of our Lord one thouſand eight hundred.

Dr. *Mr. Thomas Gibſon in Intereſt*

		dols.	cts.						days.	dol.	ct.
To Intereſt	on	35	00	from	Jan. 31 '96	to	Oct. 12 '96		256	1	47
To do.	on	2962	19	.	Feb. 2 .	to	do.		254	123	68
To do.	on	2590	42	.	May 31 .	to	do.		134	57	06
To do.	on	1733	97	.	July 2 .	to	do.		102	29	07
To do.	on	73	63	.	July 12 .	to	do.		92	1	11
To do.	on	455	52	.	Aug 25 .	to	do.		47	3	51
To do.	on	158	71	.	Sep 30 .	to	do.		12	0	31
								dols.		216	21

Dr. *Mr. William Mace in Intereſt*

1798			dols.	cts.		y.	m.	d.		dols.	cts.
March 3.	To Intereſt	on	3869	20	for	1	5	11	. . .	335	97
April 26.		on	273	6	..	1	3	18	. . .	21	29
Aug. 18.		on	400	..	..		11	26	. . .	23	73
Dec. 28.		on	414	6	..		7	16	. . .	15	59
'99 Ja. 15.		on	200	..	..		7	9	. . .	7	30
Feb. 19.		on	300	..	..		5	25	. . .	8	75
Mar. 26.		on	1300	..	..		4	18	. . .	29	90
									dols.	442	53

Account with Thomas Merchant. *Cr.*

	dols. c.			days.	dols. ct.
By intereſt on	500	from Apr. 24,'96, to Oct.	12,'96,	171	14 5
By do.	1133 25	.. 25 ..	.. 12 ..	170	31 67
By do.	296 24	May 8 ..	.. 12 ..	162	7 88
By do.	215	.. 5 ..	.. 12 ..	160	5 65
By do.	215 80	June 9 ..	.. 12 ..	125	4 45
By do.	109 74	.. 24 ..	.. 12 ..	110	2 0
By do.	517 90	July 20 ..	.. 12 ..	84	7 15
Balance due on this account carried to the debit of account					143 38
				Dols.	216 21

Salem, &c.

Account with Thomas Merchant. *Cr.*

1799.		dols. cts.	Y. m. d.	dols. cts.
Jan. 16.	By intereſt on	339 67		
		427 81		
		767 48	.. 6 18	25 82
	Balance carried to account current		- - - -	417 21
			dols.	442 53

Salem, Aug. 26th, 1799.
Errors Excepted.
THOMAS MERCHANT.

CHARTER-PARTY.

THIS Charter-party of affreightment indented, made and fully concluded upon this ninth day of June, in the year of our Lord, one thouſand, eight hundred, between J. P. of Boſton, in the county of Suffolk, and Commonwealth of Maſſachuſetts, merchant, owner of the good ſhip Helen, of the burden of two hundred tons, or thereabouts, now lying in the harbour of Boſton, whereof R. P. is at preſent maſter, on the one part, and C. D. of ſaid Boſton, merchant, on the other part, *Witneſſeth*, That the ſaid J. P. for the conſideration hereafter mentioned, hath letten to freight the aforeſaid ſhip, with the appurtenances to her belonging, for a voyage to be made by the ſaid ſhip to London, where ſhe is to be diſcharged (the danger of the ſeas excepted) and the ſaid J. P. doth by theſe preſents covenant and agree with the ſaid C. D. in manner following, *That is to ſay*, That the ſaid ſhip in and during the voyage aforeſaid, ſhall be tight, ſtaunch and ſtrong, and ſufficiently tackled and apparelled with all things neceſſary for ſuch a veſſel and voyage; and that it ſhall and may be lawful for the ſaid C. D. his agents or factors, as well at London as at Boſton to load and put on board the ſaid ſhip, loading of ſuch goods and merchandize as they ſhall think proper, contraband goods excepted.

IN conſideration whereof, the ſaid C. D. doth by theſe preſents agree with the ſaid J. P. well and truly to pay, or cauſe to be paid, unto him, in full for the freight or hire of ſaid ſhip and appurtenances, the ſum of three dollars per ton, per calendar month, and ſo in proportion for a leſs time, as the ſaid ſhip ſhall be continued in the aforeſaid ſervice, in ſixty days after her return to Boſton. And the ſaid C. D. doth agree to pay the charge of victualling and manning ſaid ſhip and all port charges and pilotage during ſaid voyage, and to deliver the ſaid ſhip on her return to Boſton, to the owner aforeſaid or his order. And to the true and faithful of all and ſingular the covenants, payments and agreements aforementioned, each of the parties aforenamed binds and obliges himſelf, his executors and adminiſtrators, in the penal ſum of two thouſand dollars firmly by theſe preſents. In witneſs whereof, the parties aforeſaid have hereunto interchangeably ſet their hands and ſeals the day and year afore-written.

BILL OF LADING.

J. R. No. 1 to 53 *caſks potaſh* tons. cwt. lbs. 9 18 at 80 = 25 12 0 Tarre 3 per cent 1 15 7 — 23 17 7

SHIPPED in good order and well conditioned by John Rolly, in and upon the good ſhip called the Iris, whereof is maſter for this preſent voyage Charles Ely, and now riding at anchor in the harbour of Newport, and bound for Liverpool, to ſay, *fifty-three caſks of potaſh containing eight tons and eighteen cwt.* being marked and numbered as in the margin, and are to be delivered in the like good order and well conditioned, at the aforeſaid port of Liverpool (the danger of the ſeas excepted) unto Mr. J. May or to his aſſigns, they paying freight for the ſaid goods, *four pounds* Britiſh ſterling *per ton*, with Five per cent. primage. In witneſs whereof the maſter or purſer of the ſaid ſhip hath affirmed to three bills of Lading all of this tenor and date; the one of which [illegible] compliſhed, the other two to ſtand void.

Newport, July 7th, 1800. C. ELY.

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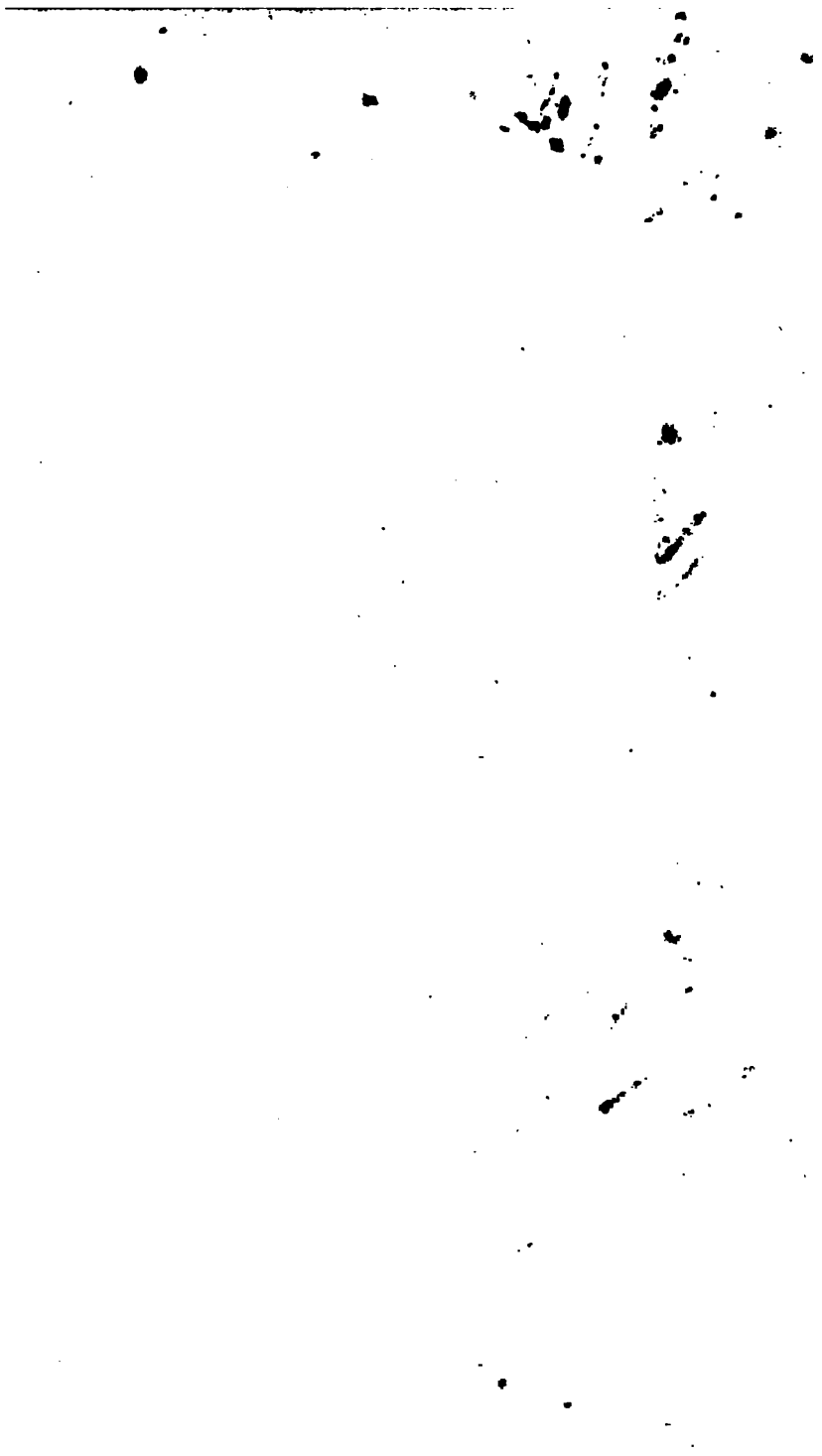
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